



13-083-3-D2-SQL-Substitute-(12-28-05).txt

SEQUENCE LISTING

<110> BOEHRINGER INGELHEIM (CANADA) LTD.

<120> SELF REPLICATING RNA MOLECULE FROM
HEPATITIS C VIRUS

<130> 13/083-3-D2

<140> 10/789,355
<141> 2004-02-27

<150> 10/309,561
<151> 2002-12-04

<150> 10/029,907
<151> 2001-12-21

<150> 60/257,857
<151> 2000-12-22

<160> 28

<170> FastSEQ for Windows Version 4.0

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<211> 8639
<212> DNA
<213> HCV

<220>
<221> CDS
<222> (1803)...(8408)

<400> 1

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ggacgaccgg gtcctttctt ggatcaaccc gctcaatgcc tggagatttg ggcgtgcccc 240
cgcgagactg ctatccgagt agtgttgggt cgcgaaaggc ctgtgtgtac tgcctgtatag 300
ggtgttgcg agtgccccgg gaggtctcgat agaccgtgtca ccatgagcac gaatccctaaa 360
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gccaggtca aggccgcgtat gcccgcacggc gaggatctcg tcgtgacccca tggcgatgtcc 960
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cc atg gac cgg gag atg gca gca tcg tgc gga ggc gcg gtt ttc gta 1847

Met Asp Arg Glu Met Ala Ala Ser Cys Gly Gly Ala Val Phe Val

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5 10 15

gtt ctg ata ctc ttg acc ttg tca ccg cac tat aag ctg ttc ctc gct Gly Leu Ile Leu Leu Thr Leu Ser Pro His Tyr Lys Leu Phe Leu Ala 20 25 30	1895
agg ctc ata tgg tgg tta caa tat ttt atc acc agg gcc gag gca cac Arg Leu Ile Trp Trp Leu Gln Tyr Phe Ile Thr Arg Ala Glu Ala His 35 40 45	1943
ttg caa gtg tgg atc ccc ccc ctc aac gtt cgg ggg ggc cgc gat gcc Leu Gln Val Trp Ile Pro Pro Leu Asn Val Arg Gly Gly Arg Asp Ala 50 55 60	1991
gtc atc ctc ctc acg tgc gcg atc cac cca gag cta atc ttt acc atc Val Ile Leu Leu Thr Cys Ala Ile His Pro Glu Leu Ile Phe Thr Ile 65 70 75	2039
acc aaa atc ttg ctc gcc ata ctc ggt cca ctc atg gtg ctc cag gct Thr Lys Ile Leu Leu Ala Ile Leu Gly Pro Leu Met Val Leu Gln Ala 80 85 90 95	2087
ggt ata acc aaa gtg ccg tac ttc gtg cgc gca cac ggg ctc att cgt Gly Ile Thr Lys Val Pro Tyr Phe Val Arg Ala His Gly Leu Ile Arg 100 105 110	2135
gca tgc atg ctg gtg cgg aag gtt gct ggg ggt cat tat gtc caa atg Ala Cys Met Leu Val Arg Lys Val Ala Gly Gly His Tyr Val Gln Met 115 120 125	2183
gct ctc atg aag ttg gcc gca ctg aca ggt acg tac gtt tat gac cat Ala Leu Met Lys Leu Ala Ala Leu Thr Gly Thr Tyr Val Tyr Asp His 130 135 140	2231
ctc acc cca ctg cgg gac tgg gcc cac gcg ggc cta cga gac ctt gcg Leu Thr Pro Leu Arg Asp Trp Ala His Ala Gly Leu Arg Asp Leu Ala 145 150 155	2279
gtg gca gtt gag ccc gtc gtc ttc tct gat atg gag acc aag gtt atc Val Ala Val Glu Pro Val Val Phe Ser Asp Met Glu Thr Lys Val Ile 160 165 170 175	2327
acc tgg ggg gca gac acc gcg gcg tgt ggg gac atc atc ttg ggc ctg Thr Trp Gly Ala Asp Thr Ala Ala Cys Gly Asp Ile Ile Leu Gly Leu 180 185 190	2375
ccc gtc tcc gcc cgc agg ggg agg gag ata cat ctg gga ccg gca gac Pro Val Ser Ala Arg Arg Gly Arg Glu Ile His Leu Gly Pro Ala Asp 195 200 205	2423
agc ctt gaa ggg cag ggg tgg cga ctc ctc gcg cct att acg gcc tac Ser Leu Glu Gly Gln Gly Trp Arg Leu Leu Ala Pro Ile Thr Ala Tyr 210 215 220	2471
tcc caa cag acg cga ggc cta ctt ggc tgc atc atc act agc ctc aca Ser Gln Gln Thr Arg Gly Leu Leu Gly Cys Ile Ile Thr Ser Leu Thr 225 230 235	2519
ggc cgg gac agg aac cag gtc gag ggg gag gtc caa gtg gtc tcc acc Gly Arg Asp Arg Asn Gln Val Glu Gly Glu Val Gln Val Val Ser Thr 240 245 250 255	2567
gca aca caa tct ttc ctg gcg acc tgc gtc aat ggc gtg tgt tgg act Ala Thr Gln Ser Phe Leu Ala Thr Cys Val Asn Gly Val Cys Trp Thr 260 265 270	2615
gtc tat cat ggt gcc ggc tca aag acc ctt gcc ggc cca aag ggc cca Val Tyr His Gly Ala Gly Ser Lys Thr Leu Ala Gly Pro Lys Gly Pro	2663

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275

280

285

atc acc caa atg tac acc aat gtg gac cag gac ctc gtc ggc tgg caa Ile Thr Gln Met Tyr Thr Asn Val Asp Gln Asp Leu Val Gly Trp Gln 290 295 300	2711
gcg ccc ccc ggg gcg cgt tcc ttg aca cca tgc acc tgc ggc agc tcg Ala Pro Pro G1y Ala Arg Ser Leu Thr Pro Cys Thr Cys G1y Ser Ser 305 310 315	2759
gac ctt tac ttg gtc acg agg cat gcc gat gtc att ccg gtc cgc cg Asp Leu Tyr Leu Val Thr Arg His Ala Asp Val Ile Pro Val Arg Arg 320 325 330 335	2807
cgg ggc gac agc agg ggg agc cta ctc tcc ccc agg ccc gtc tcc tac Arg Gly Asp Ser Arg Gly Ser Leu Leu Ser Pro Arg Pro Val Ser Tyr 340 345 350	2855
ttg aag ggc tct tcg ggc ggt cca ctg ctc tgc ccc tcg ggg cac gct Leu Lys G1y Ser Ser G1y Gly Pro Leu Leu Cys Pro Ser G1y His Ala 355 360 365	2903
gtg ggc atc ttt cgg gcc gtg tgc acc cga ggg gtt gcg aag gcg Val G1y Ile Phe Arg Ala Ala Val Cys Thr Arg G1y Val Ala Lys Ala 370 375 380	2951
gtg gac ttt gta ccc gtc gag tct atg gaa acc act atg cgg tcc ccg Val Asp Phe Val Pro Val Glu Ser Met Glu Thr Thr Met Arg Ser Pro 385 390 395	2999
gtc ttc acg gac aac tcg tcc cct ccg gcc gta ccg cag aca ttc cag Val Phe Thr Asp Asn Ser Ser Pro Pro Ala Val Pro Gln Thr Phe G1n 400 405 410 415	3047
gtg gcc cat cta cac gcc cct act ggt agc ggc aag agc act aag gtg Val Ala His Leu His Ala Pro Thr G1y Ser Gly Lys Ser Thr Lys Val 420 425 430	3095
ccg gct gcg tat gca gcc caa ggg tat aag gtg ctt gtc ctg aac ccg Pro Ala Ala Tyr Ala Ala Gln G1y Tyr Lys Val Leu Val Leu Asn Pro 435 440 445	3143
tcc gtc gcc acc cta ggt ttc ggg gcg tat atg tct aag gca cat Ser Val Ala Ala Thr Leu G1y Phe G1y Ala Tyr Met Ser Lys Ala His 450 455 460	3191
ggt atc gac cct aac atc aga acc ggg gta agg acc atc acc acg ggt Gly Ile Asp Pro Asn Ile Arg Thr G1y Val Arg Thr Ile Thr Thr G1y 465 470 475	3239
gcc ccc atc acg tac tcc acc tat ggc aag ttt ctt gcc gac ggt ggt Ala Pro Ile Thr Tyr Ser Thr Tyr G1y Lys Phe Leu Ala Asp G1y G1y 480 485 490 495	3287
tgc tct ggg ggc gcc tat gac atc ata ata tgt gat gag tgc cac tca Cys Ser G1y G1y Ala Tyr Asp Ile Ile Ile Cys Asp Glu Cys His Ser 500 505 510	3335
act gac tcg acc act atc ctg ggc atc ggc aca gtc ctg gac caa gcg Thr Asp Ser Thr Thr Ile Leu G1y Ile G1y Thr Val Leu Asp Gln Ala 515 520 525	3383
gag acg gct gga gcg cga ctc gtc gtg ctc gcc acc gct acg cct ccg Glu Thr Ala G1y Ala Arg Leu Val Val Leu Ala Thr Ala Thr Pro Pro 530 535 540	3431
gga tcg gtc acc gtg cca cat cca aac atc gag gag gtg gct ctg tcc Gly Ser Val Thr Val Pro His Pro Asn Ile Glu Glu Val Ala Leu Ser	3479

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Ser Thr Gly Glu Ile Pro Phe Tyr Gly Lys Ala Ile Pro Ile Glu Thr			
560	565	570	575
atc aag ggg ggg agg cac ctc att ttc tgc cat tcc aag aag aaa tgt 3575			
Ile Lys Gly Gly Arg His Leu Ile Phe Cys His Ser Lys Lys Lys Cys			
580	585	590	
gat gag ctc gcc gcg aag ctg tcc ggc ctc gga ctc aat gct gta gca 3623			
Asp Glu Leu Ala Ala Lys Leu Ser Gly Leu Gly Leu Asn Ala Val Ala			
595	600	605	
tat tac cgg ggc ctt gat gta tcc gtc ata cca act agc gga gac gtc 3671			
Tyr Tyr Arg Gly Leu Asp Val Ser Val Ile Pro Thr Ser Gly Asp Val			
610	615	620	
att gtc gta gca acg gac gct cta atg acg ggc ttt acc ggc gat ttc 3719			
Ile Val Val Ala Thr Asp Ala Leu Met Thr Gly Phe Thr Gly Asp Phe			
625	630	635	
gac tca gtg atc gac tgc aat aca tgt gtc acc cag aca gtc gac ttc 3767			
Asp Ser Val Ile Asp Cys Asn Thr Cys Val Thr Gln Thr Val Asp Phe			
640	645	650	655
agc ctg gac ccg acc ttc acc att gag acg acg acc gtg cca caa gac 3815			
Ser Leu Asp Pro Thr Phe Thr Ile Glu Thr Thr Val Pro Gln Asp			
660	665	670	
gcg gtg tca cgc tcg cag cgg cga ggc agg act ggt agg ggc agg atg 3863			
Ala Val Ser Arg Ser Gln Arg Arg Gly Arg Thr Gly Arg Gly Arg Met			
675	680	685	
ggc att tac agg ttt gtg act cca gga gaa cgg ccc tcg ggc atg ttc 3911			
Gly Ile Tyr Arg Phe Val Thr Pro Gly Glu Arg Pro Ser Gly Met Phe			
690	695	700	
gat tcc tcg gtt ctg tgc gag tgc tat gac gcg ggc tgt gct tgg tac 3959			
Asp Ser Ser Val Leu Cys Glu Cys Tyr Asp Ala Gly Cys Ala Trp Tyr			
705	710	715	
gag ctc acg ccc gcc gag acc tca gtt agg ttg cgg gct tac cta aac 4007			
Glu Leu Thr Pro Ala Glu Thr Ser Val Arg Leu Arg Ala Tyr Leu Asn			
720	725	730	735
aca cca ggg ttg ccc gtc tgc cag gac cat ctg gag ttc tgg gag agc 4055			
Thr Pro Gly Leu Pro Val Cys Gln Asp His Leu Glu Phe Trp Glu Ser			
740	745	750	
gtc ttt aca ggc ctc acc cac ata gac gcc cat ttc ttg tcc cag act 4103			
Val Phe Thr Gly Leu Thr His Ile Asp Ala His Phe Leu Ser Gln Thr			
755	760	765	
aag cag gca gga gac aac ttc ccc tac ctg gta gca tac cag gct acg 4151			
Lys Gln Ala Gly Asp Asn Phe Pro Tyr Leu Val Ala Tyr Gln Ala Thr			
770	775	780	
gtg tgc gcc agg gct cag gct cca cct cca tcg tgg gac caa atg tgg 4199			
Val Cys Ala Arg Ala Gln Ala Pro Pro Pro Ser Trp Asp Gln Met Trp			
785	790	795	
aag tgt ctc ata cgg cta aag cct acg ctg cac ggg cca acg ccc ctg 4247			
Lys Cys Leu Ile Arg Leu Lys Pro Thr Leu His Gly Pro Thr Pro Leu			
800	805	810	815
ctg tat agg ctg gga gcc gtt caa aac gag gtt act acc aca cac ccc 4295			
Leu Tyr Arg Leu Gly Ala Val Gln Asn Glu Val Thr Thr Thr His Pro			

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820	825	830	
ata acc aaa tac atc atg gca tgc atg tcg gct gac ctg gag gtc gtc Ile Thr Lys Tyr Ile Met Ala Cys Met Ser Ala Asp Leu Glu Val Val 835 840 845			4343
acg agc acc tgg gtg ctg gta ggc gga gtc cta gca gct ctg gcc gcg Thr Ser Thr Trp Val Leu Val Gly Gly Val Leu Ala Ala Leu Ala Ala 850 855 860			4391
tat tgc ctg aca aca ggc agc gtg gtc att gtg ggc agg atc atc ttg Tyr Cys Leu Thr Thr Gly Ser Val Val Ile Val Gly Arg Ile Ile Leu 865 870 875			4439
tcc gga aag ccg gcc atc att ccc gac agg gaa gtc ctt tac cgg gag Ser Gly Lys Pro Ala Ile Ile Pro Asp Arg Glu Val Leu Tyr Arg Glu 880 885 890 895			4487
ttc gat gag atg gaa gag tgc gcc tca cac ctc cct tac atc gaa cag Phe Asp Glu Met Glu Glu Cys Ala Ser His Leu Pro Tyr Ile Glu Gln 900 905 910			4535
gga atg cag ctc gcc gaa caa ttc aaa cag aag gca atc ggg ttg ctg Gly Met Gln Leu Ala Glu Gln Phe Lys Gln Lys Ala Ile Gly Leu Leu 915 920 925			4583
caa aca gcc acc aag caa gcg gag gct gct gct ccc gtg gtg gaa tcc Gln Thr Ala Thr Lys Gln Ala Glu Ala Ala Ala Pro Val Val Glu Ser 930 935 940			4631
aag tgg cg acc ctc gaa gcc ttc tgg gcg aag cat atg tgg aat ttc Lys Trp Arg Thr Leu Glu Ala Phe Trp Ala Lys His Met Trp Asn Phe 945 950 955			4679
atc agc ggg ata caa tat tta gca ggc ttg tcc act ctg cct ggc aac Ile Ser Gly Ile Gln Tyr Leu Ala Gly Leu Ser Thr Leu Pro Gly Asn 960 965 970 975			4727
ccc gcg ata gca tca ctg atg gca ttc aca gcc tct atc acc agc ccg Pro Ala Ile Ala Ser Leu Met Ala Phe Thr Ala Ser Ile Thr Ser Pro 980 985 990			4775
ctc acc acc caa cat acc ctc ctg ttt aac atc ctg ggg gga tgg gtg Leu Thr Thr Gln His Thr Leu Leu Phe Asn Ile Leu Gly Gly Trp Val 995 1000 1005			4823
gcc gcc caa ctt gct cct ccc agc gct gct tct gct ttc gta ggc gcc Ala Ala Gln Leu Ala Pro Pro Ser Ala Ala Ser Ala Phe Val Gly Ala 1010 1015 1020			4871
ggc atc gct gga gcg gct gtt ggc agc ata ggc ctt ggg aag gtg ctt Gly Ile Ala Gly Ala Ala Val Gly Ser Ile Gly Leu Gly Lys Val Leu 1025 1030 1035			4919
gtg gat att ttg gca ggt tat gga gca ggg gtg gca ggc gcg ctc gtg Val Asp Ile Leu Ala Gly Tyr Gly Ala Gly Val Ala Gly Ala Leu Val 1040 1045 1050 1055			4967
gcc ttt aag gtc atg agc ggc gag atg ccc tcc acc gag gac ctg gtt Ala Phe Lys Val Met Ser Gly Glu Met Pro Ser Thr Glu Asp Leu Val 1060 1065 1070			5015
aac cta ctc cct gct atc ctc tcc cct ggc gcc cta gtc gtc ggg gtc Asn Leu Leu Pro Ala Ile Leu Ser Pro Gly Ala Leu Val Val Gly Val 1075 1080 1085			5063
gtg tgc gca gcg ata ctg cgt cgg cac gtg ggc cca ggg gag ggg gct Val Cys Ala Ala Ile Leu Arg Arg His Val Gly Pro Gly Glu Gly Ala			5111

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1090

1095

1100

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Val Gln Trp Met Asn Arg Leu Ile Ala Phe Ala Ser Arg Gly Asn His	
1105 1110 1115	
gtc tcc ccc acg cac tat gtg cct gag agc gac gct gca gca cgt gtc	5207
Val Ser Pro Thr His Tyr Val Pro Glu Ser Asp Ala Ala Ala Arg Val	
1120 1125 1130 1135	
act cag atc ctc tct agt ctt acc atc act cag ctg ctg aag agg ctt	5255
Thr Gln Ile Leu Ser Ser Leu Thr Ile Thr Gln Leu Leu Lys Arg Leu	
1140 1145 1150	
cac cag tgg atc aac gag gac tgc tcc acg cca tgc tcc ggc tcg tgg	5303
His Gln Trp Ile Asn Glu Asp Cys Ser Thr Pro Cys Ser Gly Ser Trp	
1155 1160 1165	
cta aga gat gtt tgg gat tgg ata tgc acg gtg ttg act gat ttc aag	5351
Leu Arg Asp Val Trp Asp Trp Ile Cys Thr Val Leu Thr Asp Phe Lys	
1170 1175 1180	
acc tgg ctc cag tcc aag ctc ctg ccg cga ttg ccg gga gtc ccc ttc	5399
Thr Trp Leu Gln Ser Lys Leu Leu Pro Arg Leu Pro Gly Val Pro Phe	
1185 1190 1195	
ttc tca tgt caa cgt ggg tac aag gga gtc tgg cgg ggc gac ggc atc	5447
Phe Ser Cys Gln Arg Gly Tyr Lys Gly Val Trp Arg Gly Asp Gly Ile	
1200 1205 1210 1215	
atg caa acc acc tgc cca tgt gga gca cag atc acc gga cat gtg aaa	5495
Met Gln Thr Thr Cys Pro Cys Gly Ala Gln Ile Thr Gly His Val Lys	
1220 1225 1230	
aac ggt tcc atg agg atc gtg ggg cct agg acc tgt agt aac acg tgg	5543
Asn Gly Ser Met Arg Ile Val Gly Pro Arg Thr Cys Ser Asn Thr Trp	
1235 1240 1245	
cat gga aca ttc ccc att aac gc ^g tac acc acg ggc ccc tgc acg ccc	5591
His Gly Thr Phe Pro Ile Asn Ala Tyr Thr Thr Gly Pro Cys Thr Pro	
1250 1255 1260	
tcc ccg gc ^g cca aat tat tct agg gc ^g ctg tgg cgg gtg gct gct gag	5639
Ser Pro Ala Pro Asn Tyr Ser Arg Ala Leu Trp Arg Val Ala Ala Glu	
1265 1270 1275	
gag tac gtg gag gtt acg ccg gtg ggg gat ttc cac tac gtg acg ggc	5687
Glu Tyr Val Glu Val Thr Arg Val Gly Asp Phe His Tyr Val Thr Gly	
1280 1285 1290 1295	
atg acc act gac aac gta aag tgc ccg tgt cag gtt ccg gcc ccc gaa	5735
Met Thr Thr Asp Asn Val Lys Cys Pro Cys Gln Val Pro Ala Pro Glu	
1300 1305 1310	
ttc ttc aca gaa gtg gat ggg gtg ccg ttg cac agg tac gct cca gc ^g	5783
Phe Phe Thr Glu Val Asp Gly Val Arg Leu His Arg Tyr Ala Pro Ala	
1315 1320 1325	
tgc aaa ccc ctc cta cg ^g gag gag gtc aca ttc ctg gtc ggg ctc aat	5831
Cys Lys Pro Leu Leu Arg Glu Glu Val Thr Phe Leu Val Gly Leu Asn	
1330 1335 1340	
caa tac ctg gtt ggg tca cag ctc cca tgc gag ccc gaa ccg gac gta	5879
Gln Tyr Leu Val Gly Ser Gln Leu Pro Cys Glu Pro Glu Pro Asp Val	
1345 1350 1355	
gca gtg ctc act tcc atg ctc acc gac ccc tcc cac att acg gc ^g gag	5927
Ala Val Leu Thr Ser Met Leu Thr Asp Pro Ser His Ile Thr Ala Glu	

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tca tca gct agc cag ctg tct gcg cct tcc ttg aag gca aca tgc act Ser Ser Ala Ser Gln Leu Ser Ala Pro Ser Leu Lys Ala Thr Cys Thr 1395 1400 1405				6023
acc cgt cat gac tcc ccg gac gct gac ctc atc gag gcc aac ctc ctg Thr Arg His Asp Ser Pro Asp Ala Asp Leu Ile Glu Ala Asn Leu Leu 1410 1415 1420				6071
tgg cgg cag gag atg ggc ggg aac atc acc cgc gtg gag tca gaa aat Trp Arg Gln Glu Met Gly Gly Asn Ile Thr Arg Val Glu Ser Glu Asn 1425 1430 1435				6119
aag gta gta att ttg gac tct ttc gag ccg ctc caa gcg gag gag gat Lys Val Val Ile Leu Asp Ser Phe Glu Pro Leu Gln Ala Glu Glu Asp 1440 1445 1450 1455				6167
gag agg gaa gta tcc gtt ccg gcg gag atc ctg cgg agg tcc agg aaa Glu Arg Glu Val Ser Val Pro Ala Glu Ile Leu Arg Arg Ser Arg Lys 1460 1465 1470				6215
ttc cct cga gcg atg ccc ata tgg gca cgc ccg gat tac aac cct cca Phe Pro Arg Ala Met Pro Ile Trp Ala Arg Pro Asp Tyr Asn Pro Pro 1475 1480 1485				6263
ctg tta gag tcc tgg aag gac ccg gac tac gtc cct cca gtg gta cac Leu Leu Glu Ser Trp Lys Asp Pro Asp Tyr Val Pro Pro Val Val His 1490 1495 1500				6311
ggg tgt cca ttg ccg cct gcc aag gcc cct ccg ata cca cct cca cgg Gly Cys Pro Leu Pro Ala Lys Ala Pro Pro Ile Pro Pro Pro Arg 1505 1510 1515				6359
agg aag agg acg gtt gtc ctg tca gaa tct acc gtg tct tct gcc ttg Arg Lys Arg Thr Val Val Leu Ser Glu Ser Thr Val Ser Ser Ala Leu 1520 1525 1530 1535				6407
gcg gag ctc gcc aca aag acc ttc ggc agc tcc gaa tcg tcg gcc gtc Ala Glu Leu Ala Thr Lys Thr Phe Gly Ser Ser Glu Ser Ser Ala Val 1540 1545 1550				6455
gac agc ggc acg gca acg gcc tct cct gac cag ccc tcc gac gac ggc Asp Ser Gly Thr Ala Thr Ala Ser Pro Asp Gln Pro Ser Asp Asp Gly 1555 1560 1565				6503
gac gcg gga tcc gac gtt gag tcg tac tcc tcc atg ccc ccc ctt gag Asp Ala Gly Ser Asp Val Glu Ser Tyr Ser Ser Met Pro Pro Leu Glu 1570 1575 1580				6551
ggg gag ccc ggg gat ccc gat ctc agc gac ggg tct tgg tct acc gta Gly Glu Pro Gly Asp Pro Asp Leu Ser Asp Gly Ser Trp Ser Thr Val 1585 1590 1595				6599
agc gag gag gct agt gag gac gtc gtc tgc tgc tcg atg tcc tac aca Ser Glu Glu Ala Ser Glu Asp Val Val Cys Cys Ser Met Ser Tyr Thr 1600 1605 1610 1615				6647
tgg aca ggc gcc ctg atc acg cca tgc gct gcg gag gaa acc aag ctg Trp Thr Gly Ala Leu Ile Thr Pro Cys Ala Ala Glu Glu Thr Lys Leu 1620 1625 1630				6695
ccc atc aat gca ctg agc aac tct ttg ctc cgt cac cac aac ttg gtc Pro Ile Asn Ala Leu Ser Asn Ser Leu Leu Arg His His Asn Leu Val				6743

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1635

1640

1645

tat gct aca aca tct cgc agc gca agc ctg cg ^g cag aag aag gtc acc	6791
Tyr Ala Thr Thr Ser Arg Ser Ala Ser Leu Arg Gln Lys Lys Val Thr	
1650 1655 1660	
ttt gac aga ctg cag gtc ctg gac gac cac tac cg ^g gac gt ^g ctc aag	6839
Phe Asp Arg Leu Gln Val Leu Asp Asp His Tyr Arg Asp Val Leu Lys	
1665 1670 1675	
gag atg aag gcg aag gcg tcc aca gtt aag gct aaa ctt cta tcc gt ^g	6887
Glu Met Lys Ala Lys Ala Ser Thr Val Lys Ala Lys Leu Leu Ser Val	
1680 1685 1690 1695	
gag gaa gcc tgt aag ctg acg ccc cca cat tcg gcc aga tct aaa ttt	6935
Glu Glu Ala Cys Lys Leu Thr Pro Pro His Ser Ala Arg Ser Lys Phe	
1700 1705 1710	
ggc tat ggg gca aag gac gtc cg ^g aac cta tcc agc aag gcc gtt aac	6983
Gly Tyr Gly Ala Lys Asp Val Arg Asn Leu Ser Ser Lys Ala Val Asn	
1715 1720 1725	
cac atc cgc tcc gt ^g tgg aag gac ttg ctg gaa gac act gag aca cca	7031
His Ile Arg Ser Val Trp Lys Asp Leu Leu Glu Asp Thr Glu Thr Pro	
1730 1735 1740	
att gac acc acc atc atg gca aaa aat gag gtt ttc tgc gtc caa cca	7079
Ile Asp Thr Thr Ile Met Ala Lys Asn Glu Val Phe Cys Val Gln Pro	
1745 1750 1755	
gag aag ggg ggc cgc aag cca gct cg ^c ctt atc gta ttc cca gat ttg	7127
Glu Lys Gly Arg Lys Pro Ala Arg Leu Ile Val Phe Pro Asp Leu	
1760 1765 1770 1775	
ggg gtt cgt gt ^g tgc gag aaa atg gcc ctt tac gat gt ^g gtc tcc acc	7175
Gly Val Arg Val Cys Glu Lys Met Ala Leu Tyr Asp Val Val Ser Thr	
1780 1785 1790	
ctc cct cag gcc gt ^g atg ggc tct tca tac gga ttc caa tac tct cct	7223
Leu Pro Gln Ala Val Met Gly Ser Ser Tyr Gly Phe Gln Tyr Ser Pro	
1795 1800 1805	
gga cag cgg gtc gag ttc ctg gt ^g aat gcc tgg aaa gcg aag aaa tgc	7271
Gly Gln Arg Val Glu Phe Leu Val Asn Ala Trp Lys Ala Lys Lys Cys	
1810 1815 1820	
cct atg ggc ttc gca tat gac acc cgc tgt ttt gac tca acg gtc act	7319
Pro Met Gly Phe Ala Tyr Asp Thr Arg Cys Phe Asp Ser Thr Val Thr	
1825 1830 1835	
gag aat gac atc cgt gtt gag gag tca atc tac caa tgt tgt gac ttg	7367
Glu Asn Asp Ile Arg Val Glu Glu Ser Ile Tyr Gln Cys Cys Asp Leu	
1840 1845 1850 1855	
gcc ccc gaa gcc aga cag gcc ata agg tcg ctc aca gag cg ^g ctt tac	7415
Ala Pro Glu Ala Arg Gln Ala Ile Arg Ser Leu Thr Glu Arg Leu Tyr	
1860 1865 1870	
atc ggg ggc ccc ctg act aat tct aaa ggg cag aac tgc ggc tat cgc	7463
Ile Gly Gly Pro Leu Thr Asn Ser Lys Gly Gln Asn Cys Gly Tyr Arg	
1875 1880 1885	
cg ^g tgc cgc gcg agc ggt gta ctg acg acc agc tgc ggt aat acc ctc	7511
Arg Cys Arg Ala Ser Gly Val Leu Thr Thr Ser Cys Gly Asn Thr Leu	
1890 1895 1900	
aca tgt tac ttg aag gcc gct gcg gcc tgt cga gct gcg aag ctc cag	7559
Thr Cys Tyr Leu Lys Ala Ala Ala Cys Arg Ala Ala Lys Leu Gln	

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 1905 1910 1915

gac tgc acg atg ctc gta tgc gga gac gac ctt gtc gtt atc tgt gaa	7607
Asp Cys Thr Met Leu Val Cys Gly Asp Asp Leu Val Val Ile Cys Glu	
1920 1925 1930 1935	
agc gcg ggg acc caa gag gac gag gcg agc cta cg ^g gcc ttc acg gag	7655
Ser Ala Gly Thr Gln Glu Asp Glu Ala Ser Leu Arg Ala Phe Thr Glu	
1940 1945 1950	
gct atg act aga tac tct gcc ccc cct ggg gac cc ^g ccc aaa cca gaa	7703
Ala Met Thr Arg Tyr Ser Ala Pro Pro Gly Asp Pro Pro Lys Pro Glu	
1955 1960 1965	
tac gac ttg gag ttg ata aca tca tgc tcc tcc aat gtg tca gtc gc ^g	7751
Tyr Asp Leu Glu Leu Ile Thr Ser Cys Ser Ser Asn Val Ser Val Ala	
1970 1975 1980	
cac gat gca tct ggc aaa agg gtg tac tat ctc acc cgt gac ccc acc	7799
His Asp Ala Ser Gly Lys Arg Val Tyr Tyr Leu Thr Arg Asp Pro Thr	
1985 1990 1995	
acc ccc ctt gc ^g cg ^g gct gc ^g tgg gag aca gct aga cac act cca gtc	7847
Thr Pro Leu Ala Arg Ala Ala Trp Glu Thr Ala Arg His Thr Pro Val	
2000 2005 2010 2015	
aat tcc tgg cta ggc aac atc atc atg tat g ^g ccc acc ttg tgg gca	7895
Asn Ser Trp Leu Gly Asn Ile Ile Met Tyr Ala Pro Thr Leu Trp Ala	
2020 2025 2030	
agg atg atc ctg atg act cat ttc ttc tcc atc ctt cta gct cag gaa	7943
Arg Met Ile Leu Met Thr His Phe Phe Ser Ile Leu Leu Ala Gln Glu	
2035 2040 2045	
caa ctt gaa aaa gcc cta gat tgt cag atc tac ggg gcc t ^g t ^g tac tcc	7991
Gln Leu Glu Lys Ala Leu Asp Cys Gln Ile Tyr Gly Ala Cys Tyr Ser	
2050 2055 2060	
att gag cca ctt gac cta cct cag atc att caa cga ctc cac ggc ctt	8039
Ile Glu Pro Leu Asp Leu Pro Gln Ile Ile Gln Arg Leu His Gly Leu	
2065 2070 2075	
agc gca ttt tca ctc cat agt tac tct cca ggt gag atc aat agg gtg	8087
Ser Ala Phe Ser Leu His Ser Tyr Ser Pro Gly Glu Ile Asn Arg Val	
2080 2085 2090 2095	
gct tca tgc ctc agg aaa ctt ggg gta cc ^g ccc ttg cga gtc tgg aga	8135
Ala Ser Cys Leu Arg Lys Leu Gly Val Pro Pro Leu Arg Val Trp Arg	
2100 2105 2110	
cat cgg gcc aga agt gtc cgc gct agg cta ctg tcc cag ggg ggg agg	8183
His Arg Ala Arg Ser Val Arg Ala Arg Leu Leu Ser Gln Gly Gly Arg	
2115 2120 2125	
gct gcc act tgt ggc aag tac ctc ttc aac tgg gca gta agg acc aag	8231
Ala Ala Thr Cys Gly Lys Tyr Leu Phe Asn Trp Ala Val Arg Thr Lys	
2130 2135 2140	
ctc aaa ctc act cca atc cc ^g gct gc ^g tcc cag ttg gat tta tcc agc	8279
Leu Lys Leu Thr Pro Ile Pro Ala Ala Ser Gln Leu Asp Leu Ser Ser	
2145 2150 2155	
tgg ttc gtt gct ggt tac agc ggg gga gac ata tat cac agc ctg tct	8327
Trp Phe Val Ala Gly Tyr Ser Gly Gly Asp Ile Tyr His Ser Leu Ser	
2160 2165 2170 2175	
cgt gcc cga ccc cgc tgg ttc atg tgg tgc cta ctc cta ctt tct gta	8375
Arg Ala Arg Pro Arg Trp Phe Met Trp Cys Leu Leu Leu Ser Val	

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 2180 2185 2190

ggg gta ggc atc tat cta ctc ccc aac cga tga acggggagct aaacactcca 8428
 Gly Val Gly Ile Tyr Leu Leu Pro Asn Arg *
 2195 2200

ggccaaatagg ccatccgtt ttttccctt ttttttttc tttttttttt tttttttttt 8488
 tttttttttt ttttccctt tttttttcct cttttttcc ttttcttcc tttggtgct 8548
 ccatcttagc cctagtcacg gctagctgtg aaaggtccgt gagccgctt gactgcagaga 8608
 gtgctgatac tggcctctt gcagatcaag t 8639

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 <213> HCV

<220>
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 <222> (1802)...(8407)

<221> variation
 <222> 6268
 <223> r = a or g

<221> variation
 <222> 4446
 <223> r = a or g

<400> 2

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gacgaccggg	tcctttcttg	gatcaacccg	ctcaatgcct	ggagatttg	gcgtgcccc	240
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gtgcttgcga	gtgccccggg	aggtctcgta	gaccgtcaca	catgagcaca	aatccataac	360
ctcaaagaaa	aaccaaaaggg	cgcgcata	ttgaacaaga	tgattgcac	gcaggttctc	420
cggccgcttg	ggtggagagg	ctattcggct	atgactggc	acaacagaca	atcggtctgct	480
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tgcaaaggcg	gcacaacccc	agtgcacgt	tgtgagg	atagttgtgg	aaagagtcaa	1620
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tatgggatct	gatctggggc	ctcggtgac	atgcttaca	tgtgttagt	cgaggttaaa	1740
aaacgtctag	gccccccgaa	ccacggggac	gtggtttcc	tttgaaaaac	acgataatac	1800
c atg gac	cgg gag atg	gca gca tcg	tgc gga ggc	gcf gtt ttc	gta ggt	1849
Met Asp Arg Glu	Met Ala Ala Ser	Cys Gly Gly	Ala Val Phe	Val Gly		
1	5	10	15			

ctg ata ctc ttg acc ttg tca	ccg cac tat aag	ctg ttc ctc gct agg	1897
Leu Ile Leu Leu Thr Leu Ser	Pro His Tyr Lys Leu Phe	Leu Ala Arg	
20	25	30	

ctc ata tgg tgg tta caa tat ttt atc acc agg gcc gag gca cac ttg	1945
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Leu Ile Trp Trp Leu Gln Tyr Phe Ile Thr Arg Ala Glu Ala His Leu			
35	40	45	
caa gtg tgg atc ccc ccc ctc aac gtt cg ^g ggc ggc gat gcc gtc	1993		
Gln Val Trp Ile Pro Pro Leu Asn Val Arg Gly Gly Arg Asp Ala Val			
50	55	60	
atc ctc ctc acg tgc gc ^g atc cac cca gag cta atc ttt acc atc acc	2041		
Ile Leu Leu Thr Cys Ala Ile His Pro Glu Leu Ile Phe Thr Ile Thr			
65	70	75	80
aaa atc ttg ctc gcc ata ctc ggt cca ctc atg gtg ctc cag gct ggt	2089		
Lys Ile Leu Leu Ala Ile Leu Gly Pro Leu Met Val Leu Gln Ala Gly			
85	90	95	
ata acc aaa gtg cc ^g tac ttc gtg cgc gca cac ggg ctc att cgt gca	2137		
Ile Thr Lys Val Pro Tyr Phe Val Arg Ala His Gly Leu Ile Arg Ala			
100	105	110	
tgc atg ctg gtg cg ^g aag gtt gct ggg ggt cat tat gtc caa atg gct	2185		
Cys Met Leu Val Arg Lys Val Ala Gly Gly His Tyr Val Gln Met Ala			
115	120	125	
ctc atg aag ttg gcc gca ctg aca ggt acg tac gtt tat gac cat ctc	2233		
Leu Met Lys Leu Ala Ala Leu Thr Gly Thr Tyr Val Tyr Asp His Leu			
130	135	140	
acc cca ctg cg ^g gac tgg gcc cac gc ^g ggc cta cga gac ctt gc ^g gt ^g	2281		
Thr Pro Leu Arg Asp Trp Ala His Ala Gly Leu Arg Asp Leu Ala Val			
145	150	155	160
gca gtt gag ccc gtc gtc ttc tct gat atg gag acc aag gtt atc acc	2329		
Ala Val Glu Pro Val Val Phe Ser Asp Met Glu Thr Lys Val Ile Thr			
165	170	175	
tgg ggg gca gac acc gc ^g gc ^g tgt ggg gac atc atc ttg ggc ctg ccc	2377		
Trp Gly Ala Asp Thr Ala Ala Cys Gly Asp Ile Ile Leu Gly Leu Pro			
180	185	190	
gtc tcc gcc cgc agg ggg agg gag ata cat ctg gga cc ^g gca gac agc	2425		
Val Ser Ala Arg Arg Gly Arg Glu Ile His Leu Gly Pro Ala Asp Ser			
195	200	205	
ctt gaa ggg cag ggg tgg cga ctc ctc gc ^g cct att acg gcc tac tcc	2473		
Leu Glu Gly Gln Gly Trp Arg Leu Leu Ala Pro Ile Thr Ala Tyr Ser			
210	215	220	
caa cag acg cga ggc cta ctt ggc tgc atc atc act agc ctc aca ggc	2521		
Gln Gln Thr Arg Gly Leu Leu Gly Cys Ile Ile Thr Ser Leu Thr Gly			
225	230	235	240
cg ^g gac agg aac cag gtc gag ggg gag gtc caa gtg gtc tcc acc gca	2569		
Arg Asp Arg Asn Gln Val Glu Gly Glu Val Gln Val Val Ser Thr Ala			
245	250	255	
aca caa tct ttc ctg gc ^g acc tgc gtc aat ggc gtg tgt tgg act gtc	2617		
Thr Gln Ser Phe Leu Ala Thr Cys Val Asn Gly Val Cys Trp Thr Val			
260	265	270	
tat cat ggt gcc ggc tca aag acc ctt gcc ggc cca aag ggc cca atc	2665		
Tyr His Gly Ala Gly Ser Lys Thr Leu Ala Gly Pro Lys Gly Pro Ile			
275	280	285	
acc caa atg tac acc aat gtg gac cag gac ctc gtc ggc tgg caa gcg	2713		
Thr Gln Met Tyr Thr Asn Val Asp Gln Asp Leu Val Gly Trp Gln Ala			
290	295	300	
ccc ccc ggg gc ^g cgt tcc ttg aca cca tgc acc tgc ggc agc tcg gac	2761		

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Pro Pro Gly Ala Arg	Ser Leu Thr Pro Cys Thr Cys Gly Ser Ser Asp	
305	310 315	320
ctt tac ttg gtc acg agg cat gcc gat gtc att ccg gtg cgc cg	cg	2809
Leu Tyr Leu Val Thr Arg His Ala Asp Val Ile Pro Val Arg Arg Arg		
325	330	335
ggc gac agc agg ggg agc cta ctc tcc ccc agg ccc gtc tcc tac ttg		2857
Gly Asp Ser Arg Gly Ser Leu Leu Ser Pro Arg Pro Val Ser Tyr Leu		
340	345	350
aag ggc tct tcg ggc ggt cca ctg ctc tgc ccc tcg ggg cac gct gtg		2905
Lys Gly Ser Ser Gly Gly Pro Leu Leu Cys Pro Ser Gly His Ala Val		
355	360	365
ggc atc ttt cgg gct gcc gtg tgc acc cga ggg gtt gcg aag gcg gtg		2953
Gly Ile Phe Arg Ala Ala Val Cys Thr Arg Gly Val Ala Lys Ala Val		
370	375	380
gac ttt gta ccc gtc gag tct atg gaa acc act atg cgg tcc ccg gtc		3001
Asp Phe Val Pro Val Glu Ser Met Glu Thr Thr Met Arg Ser Pro Val		
385	390	395 400
ttc acg gac aac tcg tcc cct ccg gcc gta ccg cag aca ttc cag gtg		3049
Phe Thr Asp Asn Ser Ser Pro Pro Ala Val Pro Gln Thr Phe Gln Val		
405	410	415
gcc cat cta cac gcc cct act ggt agc ggc aag agc act aag gtg ccg		3097
Ala His Leu His Ala Pro Thr Gly Ser Gly Lys Ser Thr Lys Val Pro		
420	425	430
gct gcg tat gca gcc caa ggg tat aag gtg ctt gtc ctg aac ccg tcc		3145
Ala Ala Tyr Ala Ala Gln Gly Tyr Lys Val Leu Val Leu Asn Pro Ser		
435	440	445
gtc gcc gcc acc cta ggt ttc ggg gcg tat atg tct aag gca cat ggt		3193
Val Ala Ala Thr Leu Gly Phe Gly Ala Tyr Met Ser Lys Ala His Gly		
450	455	460
atc gac cct aac atc aga acc ggg gta agg acc atc acc acg ggt gcc		3241
Ile Asp Pro Asn Ile Arg Thr Gly Val Arg Thr Ile Thr Thr Gly Ala		
465	470	475 480
ccc atc acg tac tcc acc tat ggc aag ttt ctt gcc gac ggt ggt tgc		3289
Pro Ile Thr Tyr Ser Thr Tyr Gly Lys Phe Leu Ala Asp Gly Gly Cys		
485	490	495
tct ggg ggc gcc tat gac atc ata ata tgt gat gag tgc cac tca act		3337
Ser Gly Gly Ala Tyr Asp Ile Ile Ile Cys Asp Glu Cys His Ser Thr		
500	505	510
gac tcg acc act atc ctg ggc atc ggc aca gtc ctg gac caa gcg gag		3385
Asp Ser Thr Thr Ile Leu Gly Ile Gly Thr Val Leu Asp Gln Ala Glu		
515	520	525
acg gct gga gcg cga ctc gtc gtg ctc gcc acc gct acg cct ccg gga		3433
Thr Ala Gly Ala Arg Leu Val Val Leu Ala Thr Ala Thr Pro Pro Gly		
530	535	540
tcg gtc acc gtg cca cat cca aac atc gag gag gtg gct ctg tcc agc		3481
Ser Val Thr Val Pro His Pro Asn Ile Glu Glu Val Ala Leu Ser Ser		
545	550	555 560
act gga gaa atc ccc ttt tat ggc aaa gcc atc ccc atc gag acc atc		3529
Thr Gly Glu Ile Pro Phe Tyr Gly Lys Ala Ile Pro Ile Glu Thr Ile		
565	570	575
aag ggg ggg agg cac ctc att ttc tgc cat tcc aag aag aaa tgt gat		3577

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Lys	Gly	Gly	Arg	His	Leu	Ile	Phe	Cys	His	Ser	Lys	Lys	Lys	Cys	Asp	
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Glu	Leu	Ala	Ala	Lys	Leu	Ser	Gly	Leu	Gly	Leu	Asn	Ala	Val	Ala	Tyr	
595					600						605					
tac	cgg	ggc	ctt	gat	gtf	tcc	gtc	ata	cca	act	agc	gga	gac	gtc	att	3673
Tyr	Arg	Gly	Leu	Asp	Val	Ser	Val	Ile	Pro	Thr	Ser	Gly	Asp	Val	Ile	
610					615					620						
gtc	gta	gca	acg	gac	gct	cta	atg	acg	ggc	ttt	acc	gga	gat	ttc	gac	3721
Val	Val	Ala	Thr	Asp	Ala	Leu	Met	Thr	Gly	Phe	Thr	Gly	Asp	Phe	Asp	
625					630					635					640	
tca	gtg	atc	gac	tgc	aat	aca	tgt	gtc	acc	cag	aca	gtc	gac	ttc	agc	3769
Ser	Val	Ile	Asp	Cys	Asn	Thr	Cys	Val	Thr	Gln	Thr	Val	Asp	Phe	Ser	
645					650					655						
ctg	gac	ccg	acc	ttc	acc	att	gag	acg	acg	acc	gtg	cca	caa	gac	gcf	3817
Leu	Asp	Pro	Thr	Phe	Thr	Ile	Glu	Thr	Thr	Val	Pro	Gln	Asp	Ala		
660					665					670						
gtg	tca	cgc	tcg	cag	cgf	cga	ggc	agg	act	ggt	agg	ggc	agg	atg	ggc	3865
Val	Ser	Arg	Ser	Gln	Arg	Arg	Gly	Arg	Thr	Gly	Arg	Gly	Arg	Met	Gly	
675					680					685						
att	tac	agg	ttt	gtg	act	cca	gga	gaa	cgf	ccc	tcg	ggc	atg	ttc	gat	3913
Ile	Tyr	Arg	Phe	Val	Thr	Pro	Gly	Glu	Arg	Pro	Ser	Gly	Met	Phe	Asp	
690					695					700						
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Ser	Ser	Val	Leu	Cys	Glu	Cys	Tyr	Asp	Ala	Gly	Cys	Ala	Trp	Tyr	Glu	
705					710					715					720	
ctc	acg	ccc	gcc	gag	acc	tca	gtt	agg	ttg	cgg	gct	tac	cta	aac	aca	4009
Leu	Thr	Pro	Ala	Glu	Thr	Ser	Val	Arg	Leu	Arg	Ala	Tyr	Leu	Asn	Thr	
725					730					735						
cca	ggg	ttg	ccc	gtc	tgc	cag	gac	cat	ctg	gag	ttc	tgg	gag	agc	gtc	4057
Pro	Gly	Leu	Pro	Val	Cys	Gln	Asp	His	Leu	Glu	Phe	Trp	Glu	Ser	Val	
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Phe	Thr	Gly	Leu	Thr	His	Ile	Asp	Ala	His	Phe	Leu	Ser	Gln	Thr	Lys	
755					760					765						
cag	gca	gga	gac	aac	ttc	ccc	tac	ctg	gta	gca	tac	cag	gct	acg	gtf	4153
Gln	Ala	Gly	Asp	Asn	Phe	Pro	Tyr	Leu	Val	Ala	Tyr	Gln	Ala	Thr	Val	
770					775					780						
tgc	gcc	agg	gct	cag	gct	cca	cct	cca	tcg	tgg	gac	caa	atg	tgg	aag	4201
Cys	Ala	Arg	Ala	Gln	Ala	Pro	Pro	Pro	Ser	Trp	Asp	Gln	Met	Trp	Lys	
785					790					795					800	
tgt	ctc	ata	cgg	cta	aag	cct	acg	ctg	cac	ggg	cca	acg	ccc	ctg	ctg	4249
Cys	Leu	Ile	Arg	Leu	Lys	Pro	Thr	Leu	His	Gly	Pro	Thr	Pro	Leu	Leu	
805					810					815						
tat	agg	ctg	gga	gcc	gtt	caa	aac	gag	gtt	act	acc	aca	cac	ccc	ata	4297
Tyr	Arg	Leu	Gly	Ala	Val	Gln	Asn	Glu	Val	Thr	Thr	Thr	His	Pro	Ile	
820					825					830						
acc	aaa	tac	atc	atg	gca	tgc	atg	tcg	gct	gac	ctg	gag	gtc	gtc	acg	4345
Thr	Lys	Tyr	Ile	Met	Ala	Cys	Met	Ser	Ala	Asp	Leu	Glu	Val	Val	Thr	
835					840					845						
agc	acc	tgg	gtg	ctg	gta	ggc	gga	gtc	cta	gca	gct	ctg	gcc	gcf	tat	4393

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Ser	Thr	Trp	Val	Leu	Val	Gly	Gly	Val	Leu	Ala	Ala	Leu	Ala	Ala	Tyr	
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Cys	Leu	Thr	Thr	Gly	Ser	Val	Val	Ile	Val	Gly	Arg	Ile	Ile	Leu	Ser	
865				870					875						880	
gga	arg	ccg	gcc	atc	att	ccc	gac	agg	gaa	gtc	cct	tac	cg	gag	ttc	4489
Gly	Xaa	Pro	Ala	Ile	Ile	Pro	Asp	Arg	Glu	Val	Leu	Tyr	Arg	Glu	Phe	
				885					890					895		
gat	gag	atg	gaa	gag	tgc	gcc	tca	cac	ctc	cct	tac	atc	gaa	cag	gga	4537
Asp	Glu	Met	Glu	Glu	Cys	Ala	Ser	His	Leu	Pro	Tyr	Ile	Glu	Gln	Gly	
				900				905					910			
atg	cag	ctc	gcc	gaa	caa	tcc	aaa	cag	aag	gca	atc	ggg	ttg	ctg	caa	4585
Met	Gln	Leu	Ala	Glu	Gln	Phe	Lys	Gln	Lys	Ala	Ile	Gly	Leu	Leu	Gln	
				915			920					925				
aca	gcc	acc	aag	caa	gcg	gag	gct	gct	ccc	gtg	gtg	gaa	tcc	aag		4633
Thr	Ala	Thr	Lys	Gln	Ala	Glu	Ala	Ala	Ala	Pro	Val	Val	Glu	Ser	Lys	
				930			935				940					
tgg	cgg	acc	ctc	gaa	gcc	tcc	tgg	gcg	aag	cat	atg	tgg	aat	ttc	atc	4681
Trp	Arg	Thr	Leu	Glu	Ala	Phe	Trp	Ala	Lys	His	Met	Trp	Asn	Phe	Ile	
				945			950			955			960			
agc	ggg	ata	caa	tat	tta	gca	ggc	ttg	tcc	act	ctg	cct	ggc	aac	ccc	4729
Ser	Gly	Ile	Gln	Tyr	Leu	Ala	Gly	Leu	Ser	Thr	Leu	Pro	Gly	Asn	Pro	
				965			970				975					
gcg	ata	gca	tca	ctg	atg	gca	tcc	aca	gcc	tct	atc	acc	agc	ccg	ctc	4777
Ala	Ile	Ala	Ser	Leu	Met	Ala	Phe	Thr	Ala	Ser	Ile	Thr	Ser	Pro	Leu	
				980			985				990					
acc	acc	caa	cat	acc	ctc	ctg	ttt	aac	atc	ctg	ggg	gga	tgg	gtg	gcc	4825
Thr	Thr	Gln	His	Thr	Leu	Leu	Phe	Asn	Ile	Leu	Gly	Gly	Trp	Val	Ala	
				995			1000				1005					
gcc	caa	ctt	gct	ccc	agc	gct	tct	gct	ttc	gta	ggc	gcc	ggc			4873
Ala	Gln	Leu	Ala	Pro	Pro	Ser	Ala	Ala	Ser	Ala	Phe	Val	Gly	Ala	Gly	
				1010			1015			1020						
atc	gct	gga	gcf	gct	gtt	ggc	agc	ata	ggc	ctt	ggg	aag	gtg	ctt	gtg	4921
Ile	Ala	Gly	Ala	Ala	Val	Gly	Ser	Ile	Gly	Leu	Gly	Lys	Val	Leu	Val	
				1025			1030			1035			1040			
gat	att	ttg	gca	ggt	tat	gga	gca	ggg	gtg	gca	ggc	gcf	ctc	gtg	gcc	4969
Asp	Ile	Leu	Ala	Gly	Tyr	Gly	Ala	Gly	Val	Ala	Gly	Ala	Leu	Val	Ala	
				1045			1050				1055					
ttt	aag	gtc	atg	agc	ggc	gag	atg	ccc	tcc	acc	gag	gac	ctg	gtt	aac	5017
Phe	Lys	Val	Met	Ser	Gly	Glu	Met	Pro	Ser	Thr	Glu	Asp	Leu	Val	Asn	
				1060			1065				1070					
cta	ctc	cct	gct	atc	ctc	tcc	cct	ggc	gcc	cta	gtc	gtc	ggg	gtc	gtg	5065
Leu	Leu	Pro	Ala	Ile	Leu	Ser	Pro	Gly	Ala	Leu	Val	Val	Gly	Val	Val	
				1075			1080			1085						
tgc	gca	gcf	ata	ctg	cgt	cgf	cac	gtg	ggc	cca	ggg	gag	ggg	gct	gtg	5113
Cys	Ala	Ala	Ile	Leu	Arg	Arg	His	Val	Gly	Pro	Gly	Glu	Gly	Ala	Val	
				1090			1095			1100						
cag	tgg	atg	aac	cgf	ctg	ata	gcf	ttc	gct	tcg	cgf	ggt	aac	cac	gtc	5161
Gln	Trp	Met	Asn	Arg	Leu	Ile	Ala	Phe	Ala	Ser	Arg	Gly	Asn	His	Val	
				1105			1110			1115			1120			
tcc	ccc	acg	cac	tat	gtg	cct	gag	agc	gac	gct	gca	gca	cgt	gtc	act	5209

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Ser Pro Thr His Tyr Val Pro Glu Ser Asp Ala Ala Ala Arg Val Thr			
1125	1130	1135	
cag atc ctc tct agt ctt acc atc act cag ctg ctg aag agg ctt cac	5257		
Gln Ile Leu Ser Ser Leu Thr Ile Thr Gln Leu Leu Lys Arg Leu His			
1140	1145	1150	
cag tgg atc aac gag gac tgc tcc acg cca tgc tcc ggc tcg tgg cta	5305		
Gln Trp Ile Asn Glu Asp Cys Ser Thr Pro Cys Ser Gly Ser Trp Leu			
1155	1160	1165	
aga gat gtt tgg gat tgg ata tgc acg gtg ttg act gat ttc aag acc	5353		
Arg Asp Val Trp Asp Trp Ile Cys Thr Val Leu Thr Asp Phe Lys Thr			
1170	1175	1180	
tgg ctc cag tcc aag ctc ctg ccg cga ttg ccg gga gtc ccc ttc ttc	5401		
Trp Leu Gln Ser Lys Leu Leu Pro Arg Leu Pro Gly Val Pro Phe Phe			
1185	1190	1195	1200
tca tgt caa cgt ggg tac aag gga gtc tgg cg ^g ggc gac ggc atc atg	5449		
Ser Cys Gln Arg Gly Tyr Lys Gly Val Trp Arg Gly Asp Gly Ile Met			
1205	1210	1215	
caa acc acc tgc cca tgt gga gca cag atc acc gga cat gtg aaa aac	5497		
Gln Thr Thr Cys Pro Cys Gly Ala Gln Ile Thr Gly His Val Lys Asn			
1220	1225	1230	
tgt tcc atg agg atc gtq ggg cct agg acc tgt agt aac acg tgg cat	5545		
Cys Ser Met Arg Ile Val Gly Pro Arg Thr Cys Ser Asn Thr Trp His			
1235	1240	1245	
gga aca ttc ccc att aac gcg tac acc acg ggc ccc tgc acg ccc tcc	5593		
Gly Thr Phe Pro Ile Asn Ala Tyr Thr Thr Gly Pro Cys Thr Pro Ser			
1250	1255	1260	
ccg gcg cca aat tat tct agg gcg ctg tgg cg ^g gt ^g gct gct gag gag	5641		
Pro Ala Pro Asn Tyr Ser Arg Ala Leu Trp Arg Val Ala Ala Glu Glu			
1265	1270	1275	1280
tac gtg gag gtt acg cgg gtg ggg gat ttc cac tac gtg acg ggc atg	5689		
Tyr Val Glu Val Thr Arg Val Gly Asp Phe His Tyr Val Thr Gly Met			
1285	1290	1295	
acc act gac aac gta aag tgc ccg tgt cag gtt ccg gcc ccc gaa ttc	5737		
Thr Thr Asp Asn Val Lys Cys Pro Cys Gln Val Pro Ala Pro Glu Phe			
1300	1305	1310	
ttc aca gaa gtg gat ggg gtg cg ^g ttg cac agg tac gct cca gcg tgc	5785		
Phe Thr Glu Val Asp Gly Val Arg Leu His Arg Tyr Ala Pro Ala Cys			
1315	1320	1325	
aaa ccc ctc cta cgg gag gac gtc aca ttc ctg gtc ggg ctc aat caa	5833		
Lys Pro Leu Leu Arg Glu Glu Val Thr Phe Leu Val Gly Leu Asn Gln			
1330	1335	1340	
tac ctg gtt ggg tca cag ctc cca tgc gag cc ^g gaa cc ^g gac gta gca	5881		
Tyr Leu Val Gly Ser Gln Leu Pro Cys Glu Pro Glu Pro Asp Val Ala			
1345	1350	1355	1360
gtg ctc act tcc atg ctc acc gac ccc tcc cac att acg gcg gag acg	5929		
Val Leu Thr Ser Met Leu Thr Asp Pro Ser His Ile Thr Ala Glu Thr			
1365	1370	1375	
gct aag cgt agg ctg gcc agg gga tct ccc ccc tcc ttg gcc agc tca	5977		
Ala Lys Arg Arg Leu Ala Arg Gly Ser Pro Pro Ser Leu Ala Ser Ser			
1380	1385	1390	
tca gct agc cag ctg tct gcg cct tcc ttg aag gca aca tgc act acc	6025		

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Ser Ala Ser Gln Leu Ser	Ala Pro Ser Leu Lys Ala Thr Cys Thr Thr		
1395	1400	1405	
cgt cat gac tcc ccg gac gct gac ctc atc gag gcc aac ctc ctg tgg			6073
Arg His Asp Ser Pro Asp Ala Asp Leu Ile Glu Ala Asn Leu Leu Trp			
1410	1415	1420	
cgg cag gag atg ggc ggg aac atc acc cgc gtg gag tca gaa aat aag			6121
Arg Gln Glu Met Gly Asn Ile Thr Arg Val Glu Ser Glu Asn Lys			
1425	1430	1435	1440
gta gta att ttg gac tct ttc gag ccg ctc caa gcg gag gag gat gag			6169
Val Val Ile Leu Asp Ser Phe Glu Pro Leu Gln Ala Glu Glu Asp Glu			
1445	1450	1455	
agg gaa gta tcc gtt ccg gcg gag atc ctg cgg agg tcc agg aaa ttc			6217
Arg Glu Val Ser Val Pro Ala Glu Ile Leu Arg Arg Ser Arg Lys Phe			
1460	1465	1470	
cct cga gcg atg ccc ata tgg gca cgc ccg gat tac aac cct cca ctg			6265
Pro Arg Ala Met Pro Ile Trp Ala Arg Pro Asp Tyr Asn Pro Pro Leu			
1475	1480	1485	
ttr gag tcc tgg aag gac ccg gac tac gtc cct cca gtg gta cac ggg			6313
Xaa Glu Ser Trp Lys Asp Pro Asp Tyr Val Pro Pro Val Val His Gly			
1490	1495	1500	
tgt cca ttg ccg cct gcc aag gcc cct ccg ata cca cct cca cgg agg			6361
Cys Pro Leu Pro Pro Ala Lys Ala Pro Pro Ile Pro Pro Pro Arg Arg			
1505	1510	1515	1520
aag agg acg gtt gtc ctg tca gaa tct acc gtg tct tct gcc ttg gcg			6409
Lys Arg Thr Val Val Leu Ser Glu Ser Thr Val Ser Ser Ala Leu Ala			
1525	1530	1535	
gag ctc gcc aca aag acc ttc ggc agc tcc gaa tcg tcg gcc gtc gac			6457
Glu Leu Ala Thr Lys Thr Phe Gly Ser Ser Glu Ser Ser Ala Val Asp			
1540	1545	1550	
agc ggc acg gca acg gcc tct cct gac cag ccc tcc gac gac ggc gac			6505
Ser Gly Thr Ala Thr Ala Ser Pro Asp Gln Pro Ser Asp Asp Gly Asp			
1555	1560	1565	
gcg gga tcc gac gtt gag tcg tac tcc tcc atg ccc ccc ctt gag ggg			6553
Ala Gly Ser Asp Val Glu Ser Tyr Ser Ser Met Pro Pro Leu Glu Gly			
1570	1575	1580	
gag ccg ggg gat ccc gat ctc agc gac ggg tct tgg tct acc gta agc			6601
Glu Pro Gly Asp Pro Asp Leu Ser Asp Gly Ser Trp Ser Thr Val Ser			
1585	1590	1595	1600
gag gag gct agt gag gac gtc gtc tgc tcg atg tcc tac aca tgg			6649
Glu Glu Ala Ser Glu Asp Val Val Cys Cys Ser Met Ser Tyr Thr Trp			
1605	1610	1615	
aca ggc gcc ctg atc acg cca tgc gct gcg gag gaa acc aag ctg ccc			6697
Thr Gly Ala Leu Ile Thr Pro Cys Ala Ala Glu Glu Thr Lys Leu Pro			
1620	1625	1630	
atc aat gca ctg agc aac tct ttg ctc cgt cac cac aac ttg gtc tat			6745
Ile Asn Ala Leu Ser Asn Ser Leu Leu Arg His His Asn Leu Val Tyr			
1635	1640	1645	
gct aca aca tct cgc agc gca agc ctg cggt cag aag aag gtc acc ttt			6793
Ala Thr Thr Ser Arg Ser Ala Ser Leu Arg Gln Lys Lys Val Thr Phe			
1650	1655	1660	
gac aga ctg cag gtc ctg gac gac cac tac cgg gac gtg ctc aag gag			6841

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Asp Arg Leu Gln Val	Leu Asp Asp His Tyr Arg Asp Val	Leu Lys Glu	
1665	1670	1675	1680
atg aag gcg aag gcg tcc aca gtt aag gct aaa ctt cta tcc gtg gag	Met Lys Ala Lys Ala Ser Thr Val Lys Ala Lys Leu Leu Ser Val	Glu	6889
1685	1690	1695	
gaa gcc tgt aag ctg acg ccc cca cat tcg gcc aga tct aaa ttt ggc	Glu Ala Cys Lys Leu Thr Pro His Ser Ala Arg Ser Lys Phe Gly		6937
1700	1705	1710	
tat ggg gca aag gac gtc cggtt aac cta tcc agc aag gcc gtt aac cac	Tyr Gly Ala Lys Asp Val Arg Asn Leu Ser Ser Lys Ala Val Asn His		6985
1715	1720	1725	
atc cgc tcc gtg tgg aag gac ttgtt gaa gac act gag aca cca att	Ile Arg Ser Val Trp Lys Asp Leu Leu Glu Asp Thr Glu Thr Pro Ile		7033
1730	1735	1740	
gac acc acc atc atg gca aaa aat gag gtt ttctgcgtc caa cca gag	Asp Thr Thr Ile Met Ala Lys Asn Glu Val Phe Cys Val Gln Pro Glu		7081
1745	1750	1755	1760
aag ggg ggc cgc aag cca gct cgc ctt atc gta ttccca gat ttg ggg	Lys Gly Gly Arg Lys Pro Ala Arg Leu Ile Val Phe Pro Asp Leu Gly		7129
1765	1770	1775	
gtt cgt gtg tgc gag aaa atg gccc tt tac gat gtgttcc acc ctc	Val Arg Val Cys Glu Lys Met Ala Leu Tyr Asp Val Val Ser Thr Leu		7177
1780	1785	1790	
cct cag gcc gtg atg ggc tct tca tac gga ttccaa tac tct cct gga	Pro Gln Ala Val Met Gly Ser Ser Tyr Gly Phe Gln Tyr Ser Pro Gly		7225
1795	1800	1805	
cag cgg gtc gag ttc ctgtt gaa att gccc tgg aaa gcg aag aaa tgc cct	Gln Arg Val Glu Phe Leu Val Asn Ala Trp Lys Ala Lys Lys Cys Pro		7273
1810	1815	1820	
atg ggc ttc gca tat gac acc cgc tgt ttt gac tca acg gtc act gag	Met Gly Phe Ala Tyr Asp Thr Arg Cys Phe Asp Ser Thr Val Thr Glu		7321
1825	1830	1835	1840
aat gac atc cgt gtt gag gag tca atc tac caa tgt tgt gac ttg gcc	Asn Asp Ile Arg Val Glu Glu Ser Ile Tyr Gln Cys Cys Asp Leu Ala		7369
1845	1850	1855	
ccc gaa gcc aga cag gcc ata agg tcgtt ctcaca gag cgg ctt tac atc	Pro Glu Ala Arg Gln Ala Ile Arg Ser Leu Thr Glu Arg Leu Tyr Ile		7417
1860	1865	1870	
ggg ggc ccc ctgtt act aat tct aaa ggg cag aac tgc ggc tat cgc cgg	Gly Gly Pro Leu Thr Asn Ser Lys Gly Gln Asn Cys Gly Tyr Arg Arg		7465
1875	1880	1885	
tgc cgc gcg agc ggt gta ctgtt acg acc agc tgc ggtt aat acc ctc aca	Cys Arg Ala Ser Gly Val Leu Thr Thr Ser Cys Gly Asn Thr Leu Thr		7513
1890	1895	1900	
tgt tac ttg aag gcc gct gcg gcc tgt cga gct gcg aag ctc cag gac	Cys Tyr Leu Lys Ala Ala Ala Cys Arg Ala Ala Lys Leu Gln Asp		7561
1905	1910	1915	1920
tgc acg atg ctc gta tgc gga gac gac ctt gtc gtt atc tgt gaa agc	Cys Thr Met Leu Val Cys Gly Asp Asp Leu Val Val Ile Cys Glu Ser		7609
1925	1930	1935	
gcg ggg acc caa gag gac gag gcg agc cta cgg gcc ttc acg gag gct			7657

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Ala	Gly	Thr	Gln	Glu	Asp	Glu	Ala	Ser	Leu	Arg	Ala	Phe	Thr	Glu	Ala	
1940							1945							1950		
atg	act	aga	tac	tct	gcc	ccc	cct	ggg	gac	ccg	ccc	aaa	cca	gaa	tac	7705
Met	Thr	Arg	Tyr	Ser	Ala	Pro	Pro	Gly	Asp	Pro	Pro	Lys	Pro	Glu	Tyr	
1955								1960						1965		
gac	ttg	gag	ttg	ata	aca	tca	tgc	tcc	tcc	aat	gtg	tca	gtc	gcg	cac	7753
Asp	Leu	Glu	Leu	Ile	Thr	Ser	Cys	Ser	Ser	Asn	Val	Ser	Val	Ala	His	
1970							1975						1980			
gat	gca	tct	ggc	aaa	agg	gtg	tac	tat	ctc	acc	cgt	gac	ccc	acc	acc	7801
Asp	Ala	Ser	Gly	Lys	Arg	Val	Tyr	Tyr	Leu	Thr	Arg	Asp	Pro	Thr	Thr	
1985							1990						1995			2000
ccc	ctt	gcf	cgf	gct	gcf	tgg	gag	aca	gct	aga	cac	act	cca	gtc	aat	7849
Pro	Leu	Ala	Arg	Ala	Ala	Trp	Glu	Thr	Ala	Arg	His	Thr	Pro	Val	Asn	
															2015	
tcc	tgg	cta	ggc	aac	atc	atc	atg	tat	gcf	ccc	acc	ttg	tgg	gca	agg	7897
Ser	Trp	Leu	Gly	Asn	Ile	Ile	Met	Tyr	Ala	Pro	Thr	Leu	Trp	Ala	Arg	
							2020						2025			2030
atg	atc	ctg	atg	act	cat	tcc	ttc	tcc	atc	ctt	cta	gct	cag	gaa	caa	7945
Met	Ile	Leu	Met	Thr	His	Phe	Phe	Ser	Ile	Leu	Leu	Ala	Gln	Glu	Gln	
							2035						2040			2045
ctt	gaa	aaa	gcc	cta	gat	tgt	cag	atc	tac	ggg	gcc	tgt	tac	tcc	att	7993
Leu	Glu	Lys	Ala	Leu	Asp	Cys	Gln	Ile	Tyr	Gly	Ala	Cys	Tyr	Ser	Ile	
							2050						2055			2060
gag	cca	ctt	gac	cta	cct	cag	atc	att	caa	cga	ctc	cac	ggc	ctt	agc	8041
Glu	Pro	Leu	Asp	Leu	Pro	Gln	Ile	Ile	Gln	Arg	Leu	His	Gly	Leu	Ser	
							2065						2070			2075
gca	ttt	tca	ctc	cat	agt	tac	tct	cca	ggt	gag	atc	aat	agg	gtg	gct	8089
Ala	Phe	Ser	Leu	His	Ser	Tyr	Ser	Pro	Gly	Glu	Ile	Asn	Arg	Val	Ala	
							2085						2090			2095
tca	tgc	ctc	agg	aaa	ctt	ggg	gta	ccg	ccc	ttg	cga	gtc	tgg	aga	cat	8137
Ser	Cys	Leu	Arg	Lys	Leu	Gly	Val	Pro	Pro	Leu	Arg	Val	Trp	Arg	His	
							2100						2105			2110
cgf	gcc	aga	agt	gtc	cgc	gct	agg	cta	ctg	tcc	cag	ggg	ggg	agg	gct	8185
Arg	Ala	Arg	Ser	Val	Arg	Ala	Arg	Leu	Leu	Ser	Gln	Gly	Gly	Arg	Ala	
							2115						2120			2125
gcc	act	tgt	ggc	aag	tac	ctc	ttc	aac	tgg	gca	gta	agg	acc	aag	ctc	8233
Ala	Thr	Cys	Gly	Lys	Tyr	Leu	Phe	Asn	Trp	Ala	Val	Arg	Thr	Lys	Leu	
							2130						2135			2140
aaa	ctc	act	cca	atc	ccg	gct	gcf	tcc	cag	ttg	gat	tta	tcc	agc	tgg	8281
Lys	Leu	Thr	Pro	Ile	Pro	Ala	Ala	Ser	Gln	Leu	Asp	Leu	Ser	Ser	Trp	
							2145						2150			2155
ttc	gtt	gct	ggt	tac	agc	ggg	gga	gac	ata	tat	cac	agc	ctg	tct	cgt	8329
Phe	Val	Ala	Gly	Tyr	Ser	Gly	Gly	Asp	Ile	Tyr	His	Ser	Leu	Ser	Arg	
							2165						2170			2175
gcc	cga	ccc	cgc	tgg	ttc	atg	tgg	tgc	cta	ctc	cta	ctt	tct	gta	ggg	8377
Ala	Arg	Pro	Arg	Trp	Phe	Met	Trp	Cys	Leu	Leu	Leu	Ser	Val	Gly		
							2180						2185			2190
gta	ggc	atc	tat	cta	ctc	ccc	aac	cga	tga	acggggagct	aaacactcca					8427
Val	Gly	Ile	Tyr	Leu	Leu	Pro	Asn	Arg	*							
							2195						2200			

ggccaaatagg ccatcctgtt tttttccccct tttttttttt tttttttttc tttttttttt 8487

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ttttttttt ttttttttc tccttttt tcctctttt ttccctttct ttccctttgggt 8547
 ggctccatct tagccctagt cacggctagc tgtgaaaggt ccgtgagccg cttgactgca 8607
 gagagtgctg atactggcct ctctgcagat caagt 8642

<210> 3
 <211> 2201
 <212> PRT
 <213> HCV

<220>
 <221> VARIANT
 <222> 882
 <223> Xaa is Lys or Arg

<221> VARIANT
 <222> 1489
 <223> Xaa is Leu

<400> 3
 Met Asp Arg Glu Met Ala Ala Ser Cys Gly Gly Ala Val Phe Val Gly
 1 5 10 15
 Leu Ile Leu Leu Thr Leu Ser Pro His Tyr Lys Leu Phe Leu Ala Arg
 20 25 30
 Leu Ile Trp Trp Leu Gln Tyr Phe Ile Thr Arg Ala Glu Ala His Leu
 35 40 45
 Gln Val Trp Ile Pro Pro Leu Asn Val Arg Gly Gly Arg Asp Ala Val
 50 55 60
 Ile Leu Leu Thr Cys Ala Ile His Pro Glu Leu Ile Phe Thr Ile Thr
 65 70 75 80
 Lys Ile Leu Leu Ala Ile Leu Gly Pro Leu Met Val Leu Gln Ala Gly
 85 90 95
 Ile Thr Lys Val Pro Tyr Phe Val Arg Ala His Gly Leu Ile Arg Ala
 100 105 110
 Cys Met Leu Val Arg Lys Val Ala Gly Gly His Tyr Val Gln Met Ala
 115 120 125
 Leu Met Lys Leu Ala Ala Leu Thr Gly Thr Tyr Val Tyr Asp His Leu
 130 135 140
 Thr Pro Leu Arg Asp Trp Ala His Ala Gly Leu Arg Asp Leu Ala Val
 145 150 155 160
 Ala Val Glu Pro Val Val Phe Ser Asp Met Glu Thr Lys Val Ile Thr
 165 170 175
 Trp Gly Ala Asp Thr Ala Ala Cys Gly Asp Ile Ile Leu Gly Leu Pro
 180 185 190
 Val Ser Ala Arg Arg Gly Arg Glu Ile His Leu Gly Pro Ala Asp Ser
 195 200 205
 Leu Glu Gly Gln Gly Trp Arg Leu Leu Ala Pro Ile Thr Ala Tyr Ser
 210 215 220
 Gln Gln Thr Arg Gly Leu Leu Gly Cys Ile Ile Thr Ser Leu Thr Gly
 225 230 235 240
 Arg Asp Arg Asn Gln Val Glu Gly Glu Val Gln Val Val Ser Thr Ala
 245 250 255
 Thr Gln Ser Phe Leu Ala Thr Cys Val Asn Gly Val Cys Trp Thr Val
 260 265 270
 Tyr His Gly Ala Gly Ser Lys Thr Leu Ala Gly Pro Lys Gly Pro Ile
 275 280 285
 Thr Gln Met Tyr Thr Asn Val Asp Gln Asp Leu Val Gly Trp Gln Ala
 290 295 300
 Pro Pro Gly Ala Arg Ser Leu Thr Pro Cys Thr Cys Gly Ser Ser Asp
 305 310 315 320
 Leu Tyr Leu Val Thr Arg His Ala Asp Val Ile Pro Val Arg Arg Arg
 325 330 335
 Gly Asp Ser Arg Gly Ser Leu Leu Ser Pro Arg Pro Val Ser Tyr Leu
 340 345 350
 Lys Gly Ser Ser Gly Gly Pro Leu Leu Cys Pro Ser Gly His Ala Val
 355 360 365
 Gly Ile Phe Arg Ala Ala Val Cys Thr Arg Gly Val Ala Lys Ala Val
 370 375 380
 Asp Phe Val Pro Val Glu Ser Met Glu Thr Thr Met Arg Ser Pro Val

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385	Phe	Thr	Asp	Asn	Ser	Ser	Pro	Pro	Ala	Val	Pro	Gln	Thr	Phe	Gln	Val
					405				410						415	
	Ala	His	Leu	His	Ala	Pro	Thr	Gly	Ser	Gly	Lys	Ser	Thr	Lys	Val	Pro
				420				425							430	
	Ala	Ala	Tyr	Ala	Ala	Gln	Gly	Tyr	Lys	Val	Leu	Val	Leu	Asn	Pro	Ser
		435				440							445			
	Val	Ala	Ala	Thr	Leu	Gly	Phe	Gly	Ala	Tyr	Met	Ser	Lys	Ala	His	Gly
		450				455						460				
	Ile	Asp	Pro	Asn	Ile	Arg	Thr	Gly	Val	Arg	Thr	Ile	Thr	Thr	Gly	Ala
	465				470						475					480
	Pro	Ile	Thr	Tyr	Ser	Thr	Tyr	Gly	Lys	Phe	Leu	Ala	Asp	Gly	Gly	Cys
				485				490							495	
	Ser	Gly	Gly	Ala	Tyr	Asp	Ile	Ile	Ile	Cys	Asp	Glu	Cys	His	Ser	Thr
				500				505							510	
	Asp	Ser	Thr	Thr	Ile	Leu	Gly	Ile	Gly	Thr	Val	Leu	Asp	Gln	Ala	Glu
		515				520							525			
	Thr	Ala	Gly	Ala	Arg	Leu	Val	Val	Leu	Ala	Thr	Ala	Thr	Pro	Pro	Gly
		530				535					540					
	Ser	Val	Thr	Val	Pro	His	Pro	Asn	Ile	Glu	Glu	Val	Ala	Leu	Ser	Ser
	545				550						555					560
	Thr	Gly	Glu	Ile	Pro	Phe	Tyr	Gly	Lys	Ala	Ile	Pro	Ile	Glu	Thr	Ile
				565				570							575	
	Lys	Gly	Gly	Arg	His	Leu	Ile	Phe	Cys	His	Ser	Lys	Lys	Lys	Cys	Asp
				580				585							590	
	Glu	Leu	Ala	Ala	Lys	Leu	Ser	Gly	Leu	Gly	Leu	Asn	Ala	Val	Ala	Tyr
		595				600						605				
	Tyr	Arg	Gly	Leu	Asp	Val	Ser	Val	Ile	Pro	Thr	Ser	Gly	Asp	Val	Ile
	610				615						620					
	Val	Val	Ala	Thr	Asp	Ala	Leu	Met	Thr	Gly	Phe	Thr	Gly	Asp	Phe	Asp
	625				630						635					640
	Ser	Val	Ile	Asp	Cys	Asn	Thr	Cys	Val	Thr	Gln	Thr	Val	Asp	Phe	Ser
		645						650							655	
	Leu	Asp	Pro	Thr	Phe	Thr	Ile	Glu	Thr	Thr	Thr	Val	Pro	Gln	Asp	Ala
		660						665							670	
	val	Ser	Arg	Ser	Gln	Arg	Arg	Gly	Arg	Thr	Gly	Arg	Gly	Arg	Met	Gly
		675						680							685	
	Ile	Tyr	Arg	Phe	Val	Thr	Pro	Gly	Glu	Arg	Pro	Ser	Gly	Met	Phe	Asp
	690				695						700					
	Ser	Ser	Val	Leu	Cys	Glu	Cys	Tyr	Asp	Ala	Gly	Cys	Ala	Trp	Tyr	Glu
	705				710						715					720
	Leu	Thr	Pro	Ala	Glu	Thr	Ser	Val	Arg	Leu	Arg	Ala	Tyr	Leu	Asn	Thr
		725						730							735	
	Pro	Gly	Leu	Pro	Val	Cys	Gln	Asp	His	Leu	Glu	Phe	Trp	Glu	Ser	Val
		740						745							750	
	Phe	Thr	Gly	Leu	Thr	His	Ile	Asp	Ala	His	Phe	Leu	Ser	Gln	Thr	Lys
		755						760							765	
	Gln	Ala	Gly	Asp	Asn	Phe	Pro	Tyr	Leu	Val	Ala	Tyr	Gln	Ala	Thr	Val
		770						775							780	
	Cys	Ala	Arg	Ala	Gln	Ala	Pro	Pro	Pro	Ser	Trp	Asp	Gln	Met	Trp	Lys
	785					790					795					800
	Cys	Leu	Ile	Arg	Leu	Lys	Pro	Thr	Leu	His	Gly	Pro	Thr	Pro	Leu	Leu
		805						810							815	
	Tyr	Arg	Leu	Gly	Ala	Val	Gln	Asn	Glu	Val	Thr	Thr	Thr	His	Pro	Ile
		820						825							830	
	Thr	Lys	Tyr	Ile	Met	Ala	Cys	Met	Ser	Ala	Asp	Leu	Glu	Val	Val	Thr
		835						840							845	
	Ser	Thr	Trp	Val	Leu	Val	Gly	Gly	Val	Leu	Ala	Ala	Leu	Ala	Ala	Tyr
		850						855							860	
	Cys	Leu	Thr	Thr	Gly	Ser	Val	Val	Ile	Val	Gly	Arg	Ile	Ile	Leu	Ser
	865					870					875					880
	Gly	Xaa	Pro	Ala	Ile	Ile	Pro	Asp	Arg	Glu	Val	Leu	Tyr	Arg	Glu	Phe
								885			890					895
	Asp	Glu	Met	Glu	Glu	Cys	Ala	Ser	His	Leu	Pro	Tyr	Ile	Glu	Gln	Gly
			900					905							910	
	Met	Gln	Leu	Ala	Glu	Gln	Phe	Lys	Gln	Lys	Ala	Ile	Gly	Leu	Leu	Gln
		915						920							925	
	Thr	Ala	Thr	Lys	Gln	Ala	Glu	Ala	Ala	Ala	Pro	Val	Val	Glu	Ser	Lys

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930	Trp Arg Thr Leu Glu Ala Phe Trp Ala Lys His Met Trp Asn Phe Ile	940		
945	950	955	960	
Ser Gly Ile Gln Tyr Leu Ala Gly Leu Ser Thr Leu Pro Gly Asn Pro	965	970	975	
Ala Ile Ala Ser Leu Met Ala Phe Thr Ala Ser Ile Thr Ser Pro Leu	980	985	990	
Thr Thr Gln His Thr Leu Leu Phe Asn Ile Leu Gly Gly Trp Val Ala	995	1000	1005	
Ala Gln Leu Ala Pro Pro Ser Ala Ala Ser Ala Phe Val Gly Ala Gly	1010	1015	1020	
Ile Ala Gly Ala Ala Val Gly Ser Ile Gly Leu Gly Lys Val Leu Val	1025	1030	1035	1040
Asp Ile Leu Ala Gly Tyr Gly Ala Gly Val Ala Gly Ala Leu Val Ala	1045	1050	1055	
Phe Lys Val Met Ser Gly Glu Met Pro Ser Thr Glu Asp Leu Val Asn	1060	1065	1070	
Leu Leu Pro Ala Ile Leu Ser Pro Gly Ala Leu Val Val Gly Val Val	1075	1080	1085	
Cys Ala Ala Ile Leu Arg Arg His Val Gly Pro Gly Glu Gly Ala Val	1090	1095	1100	
Gln Trp Met Asn Arg Leu Ile Ala Phe Ala Ser Arg Gly Asn His Val	1105	1110	1115	1120
Ser Pro Thr His Tyr Val Pro Glu Ser Asp Ala Ala Ala Arg Val Thr	1125	1130	1135	
Gln Ile Leu Ser Ser Leu Thr Ile Thr Gln Leu Leu Lys Arg Leu His	1140	1145	1150	
Gln Trp Ile Asn Glu Asp Cys Ser Thr Pro Cys Ser Gly Ser Trp Leu	1155	1160	1165	
Arg Asp Val Trp Asp Trp Ile Cys Thr Val Leu Thr Asp Phe Lys Thr	1170	1175	1180	
Trp Leu Gln Ser Lys Leu Leu Pro Arg Leu Pro Gly Val Pro Phe Phe	1185	1190	1195	1200
Ser Cys Gln Arg Gly Tyr Lys Gly Val Trp Arg Gly Asp Gly Ile Met	1205	1210	1215	
Gln Thr Thr Cys Pro Cys Gly Ala Gln Ile Thr Gly His Val Lys Asn	1220	1225	1230	
Cys Ser Met Arg Ile Val Gly Pro Arg Thr Cys Ser Asn Thr Trp His	1235	1240	1245	
Gly Thr Phe Pro Ile Asn Ala Tyr Thr Thr Gly Pro Cys Thr Pro Ser	1250	1255	1260	
Pro Ala Pro Asn Tyr Ser Arg Ala Leu Trp Arg Val Ala Ala Glu Glu	1265	1270	1275	1280
Tyr Val Glu Val Thr Arg Val Gly Asp Phe His Tyr Val Thr Gly Met	1285	1290	1295	
Thr Thr Asp Asn Val Lys Cys Pro Cys Gln Val Pro Ala Pro Glu Phe	1300	1305	1310	
Phe Thr Glu Val Asp Gly Val Arg Leu His Arg Tyr Ala Pro Ala Cys	1315	1320	1325	
Lys Pro Leu Leu Arg Glu Glu Val Thr Phe Leu Val Gly Leu Asn Gln	1330	1335	1340	
Tyr Leu Val Gly Ser Gln Leu Pro Cys Glu Pro Glu Pro Asp Val Ala	1345	1350	1355	1360
Val Leu Thr Ser Met Leu Thr Asp Pro Ser His Ile Thr Ala Glu Thr	1365	1370	1375	
Ala Lys Arg Arg Leu Ala Arg Gly Ser Pro Pro Ser Leu Ala Ser Ser	1380	1385	1390	
Ser Ala Ser Gln Leu Ser Ala Pro Ser Leu Lys Ala Thr Cys Thr Thr	1395	1400	1405	
Arg His Asp Ser Pro Asp Ala Asp Leu Ile Glu Ala Asn Leu Leu Trp	1410	1415	1420	
Arg Gln Glu Met Gly Gly Asn Ile Thr Arg Val Glu Ser Glu Asn Lys	1425	1430	1435	1440
Val Val Ile Leu Asp Ser Phe Glu Pro Leu Gln Ala Glu Glu Asp Glu	1445	1450	1455	
Arg Glu Val Ser Val Pro Ala Glu Ile Leu Arg Arg Ser Arg Lys Phe	1460	1465	1470	
Pro Arg Ala Met Pro Ile Trp Ala Arg Pro Asp Tyr Asn Pro Pro Leu				

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Xaa Glu Ser Trp Lys Asp Pro Asp Tyr Val Pro Pro Val Val His Gly
 1475 1480 1485
 1490 1495 1500
 Cys Pro Leu Pro Pro Ala Lys Ala Pro Pro Ile Pro Pro Pro Arg Arg
 1505 1510 1515 1520
 Lys Arg Thr Val Val Leu Ser Glu Ser Thr Val Ser Ser Ala Leu Ala
 1525 1530 1535
 Glu Leu Ala Thr Lys Thr Phe Gly Ser Ser Glu Ser Ser Ala Val Asp
 1540 1545 1550
 Ser Gly Thr Ala Thr Ala Ser Pro Asp Gln Pro Ser Asp Asp Gly Asp
 1555 1560 1565
 Ala Gly Ser Asp Val Glu Ser Tyr Ser Ser Met Pro Pro Leu Glu Gly
 1570 1575 1580
 Glu Pro Gly Asp Pro Asp Leu Ser Asp Gly Ser Trp Ser Thr Val Ser
 1585 1590 1595 1600
 Glu Glu Ala Ser Glu Asp Val Val Cys Cys Ser Met Ser Tyr Thr Trp
 1605 1610 1615
 Thr Gly Ala Leu Ile Thr Pro Cys Ala Ala Glu Glu Thr Lys Leu Pro
 1620 1625 1630
 Ile Asn Ala Leu Ser Asn Ser Leu Leu Arg His His Asn Leu Val Tyr
 1635 1640 1645
 Ala Thr Thr Ser Arg Ser Ala Ser Leu Arg Gln Lys Lys Val Thr Phe
 1650 1655 1660
 Asp Arg Leu Gln Val Leu Asp Asp His Tyr Arg Asp Val Leu Lys Glu
 1665 1670 1675 1680
 Met Lys Ala Lys Ala Ser Thr Val Lys Ala Lys Leu Leu Ser Val Glu
 1685 1690 1695
 Glu Ala Cys Lys Leu Thr Pro Pro His Ser Ala Arg Ser Lys Phe Gly
 1700 1705 1710
 Tyr Gly Ala Lys Asp Val Arg Asn Leu Ser Ser Lys Ala Val Asn His
 1715 1720 1725
 Ile Arg Ser Val Trp Lys Asp Leu Leu Glu Asp Thr Glu Thr Pro Ile
 1730 1735 1740
 Asp Thr Thr Ile Met Ala Lys Asn Glu Val Phe Cys Val Gln Pro Glu
 1745 1750 1755 1760
 Lys Gly Gly Arg Lys Pro Ala Arg Leu Ile Val Phe Pro Asp Leu Gly
 1765 1770 1775
 Val Arg Val Cys Glu Lys Met Ala Leu Tyr Asp Val Val Ser Thr Leu
 1780 1785 1790
 Pro Gln Ala Val Met Gly Ser Ser Tyr Gly Phe Gln Tyr Ser Pro Gly
 1795 1800 1805
 Gln Arg Val Glu Phe Leu Val Asn Ala Trp Lys Ala Lys Lys Cys Pro
 1810 1815 1820
 Met Gly Phe Ala Tyr Asp Thr Arg Cys Phe Asp Ser Thr Val Thr Glu
 1825 1830 1835 1840
 Asn Asp Ile Arg Val Glu Glu Ser Ile Tyr Gln Cys Cys Asp Leu Ala
 1845 1850 1855
 Pro Glu Ala Arg Gln Ala Ile Arg Ser Leu Thr Glu Arg Leu Tyr Ile
 1860 1865 1870
 Gly Gly Pro Leu Thr Asn Ser Lys Gly Gln Asn Cys Gly Tyr Arg Arg
 1875 1880 1885
 Cys Arg Ala Ser Gly Val Leu Thr Thr Ser Cys Gly Asn Thr Leu Thr
 1890 1895 1900
 Cys Tyr Leu Lys Ala Ala Ala Ala Cys Arg Ala Ala Lys Leu Gln Asp
 1905 1910 1915 1920
 Cys Thr Met Leu Val Cys Gly Asp Asp Leu Val Val Ile Cys Glu Ser
 1925 1930 1935
 Ala Gly Thr Gln Glu Asp Glu Ala Ser Leu Arg Ala Phe Thr Glu Ala
 1940 1945 1950
 Met Thr Arg Tyr Ser Ala Pro Pro Gly Asp Pro Pro Lys Pro Glu Tyr
 1955 1960 1965
 Asp Leu Glu Leu Ile Thr Ser Cys Ser Ser Asn Val Ser Val Ala His
 1970 1975 1980
 Asp Ala Ser Gly Lys Arg Val Tyr Tyr Leu Thr Arg Asp Pro Thr Thr
 1985 1990 1995 2000
 Pro Leu Ala Arg Ala Ala Trp Glu Thr Ala Arg His Thr Pro Val Asn
 2005 2010 2015
 Ser Trp Leu Gly Asn Ile Ile Met Tyr Ala Pro Thr Leu Trp Ala Arg

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2020	2025	2030
Met Ile Leu Met Thr His Phe Phe Ser Ile Leu Leu Ala Gln Glu Gln		
2035	2040	2045
Leu Glu Lys Ala Leu Asp Cys Gln Ile Tyr Gly Ala Cys Tyr Ser Ile		
2050	2055	2060
Glu Pro Leu Asp Leu Pro Gln Ile Ile Gln Arg Leu His Gly Leu Ser		
2065	2070	2075
Ala Phe Ser Leu His Ser Tyr Ser Pro Gly Glu Ile Asn Arg Val Ala		
2085	2090	2095
Ser Cys Leu Arg Lys Leu Gly Val Pro Pro Leu Arg Val Trp Arg His		
2100	2105	2110
Arg Ala Arg Ser Val Arg Ala Arg Leu Leu Ser Gln Gly Gly Arg Ala		
2115	2120	2125
Ala Thr Cys Gly Lys Tyr Leu Phe Asn Trp Ala Val Arg Thr Lys Leu		
2130	2135	2140
Lys Leu Thr Pro Ile Pro Ala Ala Ser Gln Leu Asp Leu Ser Ser Trp		
2145	2150	2155
Phe Val Ala Gly Tyr Ser Gly Gly Asp Ile Tyr His Ser Leu Ser Arg		
2165	2170	2175
Ala Arg Pro Arg Trp Phe Met Trp Cys Leu Leu Leu Ser Val Gly		
2180	2185	2190
Val Gly Ile Tyr Leu Leu Pro Asn Arg		
2195	2200	

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<212> DNA
<213> HCV

<220>
<221> CDS
<222> (1802)...(8407)

<400> 4

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ccccccccc	gggagagcca	tagtggctcg	cggAACCGT	gagtacaccg	gaattgccag	180
gacgaccggg	tcctttcttg	gatcaacccg	ctcaatgcct	ggagatttgg	gcgtgcccc	240
gcgagactgc	tagccgagta	gtgttgggtc	gcgaaaggcc	tttgtggtaact	gcctgatagg	300
gtgcttcgca	gtgccccggg	aggctctcgta	gaccgtgcac	catgagcagc	aatcccaaac	360
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cggccgcctt	ggtggagagg	ctattcggt	atgactggc	gcaacagaca	atcggtctgct	480
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cattcgacca	ccaagcgaaa	catcgatcg	agcgagacg	tactcggatg	gaagccggc	840
ttgtcgatca	ggatgatctg	gacgaagacg	atcaggggct	cgcgcagcc	gaactgttcg	900
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tatggatct	gatctggggc	ctcggtgac	atgcttaca	tgtgttttagt	cgaggtttaga	1740
aaacgtctag	gccccccgaa	ccacggggac	gtggtttcc	tttgaaaaac	acgataatac	1800
c atg	gac	cgg	gag	atg	gca	1849
Met	Asp	Arg	Glu	Met	Ala	
1	5	10	15			

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ctg ata ctc ttg acc ttg tca ccg cac tat aag ctg ttc ctc gct agg Leu Ile Leu Leu Thr Leu Ser Pro His Tyr Lys Leu Phe Leu Ala Arg 20 25 30	1897
ctc ata tgg tgg tta caa tat ttt atc acc agg gcc gag gca cac ttg Leu Ile Trp Trp Leu Gln Tyr Phe Ile Thr Arg Ala Glu Ala His Leu 35 40 45	1945
caa gtg tgg atc ccc ccc ctc aac gtt cgg ggg ggc cgc gat gcc gtc Gln Val Trp Ile Pro Pro Leu Asn Val Arg Gly Gly Arg Asp Ala Val 50 55 60	1993
atc ctc ctc acg tgc gcg atc cac cca gag cta atc ttt acc atc acc Ile Leu Leu Thr Cys Ala Ile His Pro Glu Leu Ile Phe Thr Ile Thr 65 70 75 80	2041
aaa atc ttg ctc gcc ata ctc ggt cca ctc atg gtg ctc cag gct ggt Lys Ile Leu Leu Ala Ile Leu Gly Pro Leu Met Val Leu Gln Ala Gly 85 90 95	2089
ata acc aaa gtg ccg tac ttc gtg cgc gca cac ggg ctc att cgt gca Ile Thr Lys Val Pro Tyr Phe Val Arg Ala His Gly Leu Ile Arg Ala 100 105 110	2137
tgc atg ctg gtg cgg aag gtt gct ggg ggt cat tat gtc caa atg gct Cys Met Leu Val Arg Lys Val Ala Gly Gly His Tyr Val Gln Met Ala 115 120 125	2185
ctc atg aag ttg gcc gca ctg aca ggt acg tac gtt tat gac cat ctc Leu Met Lys Leu Ala Ala Leu Thr Gly Thr Tyr Val Tyr Asp His Leu 130 135 140	2233
acc cca ctg cgg gac tgg gcc cac gcg ggc cta cga gac ctt gcg gtg Thr Pro Leu Arg Asp Trp Ala His Ala Gly Leu Arg Asp Leu Ala Val 145 150 155 160	2281
gca gtt gag ccc gtc gtc ttc tct gat atg gag acc aag gtt atc acc Ala Val Glu Pro Val Val Phe Ser Asp Met Glu Thr Lys Val Ile Thr 165 170 175	2329
tgg ggg gca gac acc gcg gcg tgt ggg gac atc atc ttg ggc ctg ccc Trp Gly Ala Asp Thr Ala Ala Cys Gly Asp Ile Ile Leu Gly Leu Pro 180 185 190	2377
gtc tcc gcc cgc agg ggg agg gag ata cat ctg gga ccg gca gac agc Val Ser Ala Arg Arg Gly Arg Glu Ile His Leu Gly Pro Ala Asp Ser 195 200 205	2425
ctt gaa ggg cag ggg tgg cga ctc ctc gcg cct att acg gcc tac tcc Leu Glu Gln Gln Trp Arg Leu Leu Ala Pro Ile Thr Ala Tyr Ser 210 215 220	2473
caa cag acg cga ggc cta ctt ggc tgc atc atc act agc ctc aca ggc Gln Gln Thr Arg Gly Leu Leu Gly Cys Ile Ile Thr Ser Leu Thr Gly 225 230 235 240	2521
cgg gac agg aac cag gtc gag ggg gag gtc caa gtg gtc tcc acc gca Arg Asp Arg Asn Gln Val Glu Gly Glu Val Gln Val Val Ser Thr Ala 245 250 255	2569
aca caa tct ttc ctg gcg acc tgc gtc aat ggc gtg tgt tgg act gtc Thr Gln Ser Phe Leu Ala Thr Cys Val Asn Gly Val Cys Trp Thr Val 260 265 270	2617
tat cat ggt gcc ggc tca aag acc ctt gcc ggc cca aag ggc cca atc Tyr His Gly Ala Gly Ser Lys Thr Leu Ala Gly Pro Lys Gly Pro Ile 275 280 285	2665

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acc caa atg tac acc aat gtg gac cag gac ctc gtc ggc tgg caa gcg Thr Gln Met Tyr Thr Asn Val Asp Gln Asp Leu Val Gly Trp Gln Ala	2713
290 295 300	
ccc ccc ggg gcg cgt tcc ttg aca cca tgc acc tgc ggc agc tcg gac Pro Pro Gly Ala Arg Ser Leu Thr Pro Cys Thr Cys Gly Ser Ser Asp	2761
305 310 315 320	
ctt tac ttg gtc acg aag cat gcc gat gtc att ccg gtg cgc cg _g cg _g Leu Tyr Leu Val Thr Lys His Ala Asp Val Ile Pro Val Arg Arg Arg	2809
325 330 335	
ggc gac agc agg ggg agc cta ctc tcc ccc cgg ccc gtc tcc tac ttg Gly Asp Ser Arg Gly Ser Leu Leu Ser Pro Arg Pro Val Ser Tyr Leu	2857
340 345 350	
aag ggc tct tcg ggc ggt cca ctg ctc tgc ccc tcg ggg cac gct gtg Lys Gly Ser Ser Gly Gly Pro Leu Leu Cys Pro Ser Gly His Ala Val	2905
355 360 365	
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370 375 380	
gac ttt gta ccc gtc gag tct atg gaa acc act atg cgg tcc ccg gtc Asp Phe Val Pro Val Glu Ser Met Glu Thr Thr Met Arg Ser Pro Val	3001
385 390 395 400	
ttc acg gac aac tcg tcc cct ccg gcc gta ccg cag aca ttc cag gtg Phe Thr Asp Asn Ser Ser Pro Pro Ala Val Pro Gln Thr Phe Gln Val	3049
405 410 415	
gcc cat cta cac gcc cct act ggt agc ggc aag agc act aag gtg ccg Ala His Leu His Ala Pro Thr Gly Ser Gly Lys Ser Thr Lys Val Pro	3097
420 425 430	
gct gcg tat gca gcc caa ggg tat aag gtg ctt gtc ctg aac ccg tcc Ala Ala Tyr Ala Ala Gln Gly Tyr Lys Val Leu Val Leu Asn Pro Ser	3145
435 440 445	
gtc gcc gcc acc cta ggt ttc ggg gcg tat atg tct aag gca cat ggt Val Ala Ala Thr Leu Gly Phe Gly Ala Tyr Met Ser Lys Ala His Gly	3193
450 455 460	
atc gac cct aac atc aga acc ggg gta agg acc atc acc acg ggt gcc Ile Asp Pro Asn Ile Arg Thr Gly Val Arg Thr Ile Thr Thr Gly Ala	3241
465 470 475 480	
ccc atc acg tac tcc acc tat ggc aag ttt ctt gcc gac ggt ggt tgc Pro Ile Thr Tyr Ser Thr Tyr Gly Lys Phe Leu Ala Asp Gly Gly Cys	3289
485 490 495	
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515 520 525	
acg gct gga gc _g cga ctc gtc gtg ctc gcc acc gct acg cct ccg gga Thr Ala Gly Ala Arg Leu Val Val Leu Ala Thr Ala Thr Pro Pro Gly	3433
530 535 540 555	
tcg gtc acc gtg cca cat cca aac atc gag gag gtg gct ctg tcc agc Ser Val Thr Val Pro His Pro Asn Ile Glu Glu Val Ala Leu Ser Ser	3481
545 550 555 560	

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aag ggg ggg agg cac ctc att ttc tgc cat tcc aag aag aaa tgt gat Lys Gly Gly Arg His Leu Ile Phe Cys His Ser Lys Lys Lys Cys Asp 580 585 590	3577
gag ctc gcc gcg aag ctg tcc ggc ctc gga ctc aat gct gta gca tat Glu Leu Ala Ala Lys Leu Ser Gly Leu Gly Leu Asn Ala Val Ala Tyr 595 600 605	3625
tac cgg ggc ctt gat gta tcc gtc ata cca act agc gga gac gtc att Tyr Arg Gly Leu Asp Val Ser Val Ile Pro Thr Ser Gly Asp Val Ile 610 615 620	3673
gtc gta gca acg gac gct cta atg acg ggc ttt acc ggc gat ttc gac Val Val Ala Thr Asp Ala Leu Met Thr Gly Phe Thr Gly Asp Phe Asp 625 630 635 640	3721
tca gtg atc gac tgc aat aca tgt gtc acc cag aca gtc gac ttc agc Ser Val Ile Asp Cys Asn Thr Cys Val Thr Gln Thr Val Asp Phe Ser 645 650 655	3769
ctg gac ccg acc ttc acc att gag acg acg acc gtg cca caa gac gcg Leu Asp Pro Thr Phe Thr Ile Glu Thr Thr Val Pro Gln Asp Ala 660 665 670	3817
gtg tca cgc tcg cag cg ^g cga ggc agg act ggt agg ggc agg atg ggc Val Ser Arg Ser Gln Arg Arg Gly Arg Thr Gly Arg Gly Arg Met Gly 675 680 685	3865
att tac agg ttt gtg act cca gga gaa cgg ccc tcg ggc atg ttc gat Ile Tyr Arg Phe Val Thr Pro Gly Glu Arg Pro Ser Gly Met Phe Asp 690 695 700	3913
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ctc acg ccc gcc gag acc tca gtt agg ttg cgg gct tac cta aac aca Leu Thr Pro Ala Glu Thr Ser Val Arg Leu Arg Ala Tyr Leu Asn Thr 725 730 735	4009
cca ggg ttg ccc gtc tgc cag gac cat ctg gag ttc tgg gag ggc gtc Pro Gly Leu Pro Val Cys Gln Asp His Leu Glu Phe Trp Glu Gly Val 740 745 750	4057
ttt aca ggc ctc acc cac ata gac gcc cat ttc ttg tcc cag act aag Phe Thr Gly Leu Thr His Ile Asp Ala His Phe Leu Ser Gln Thr Lys 755 760 765	4105
cag gca gga gac aac ttc ccc tac ctg gta gca tac cag gct acg gtg Gln Ala Gly Asp Asn Phe Pro Tyr Leu Val Ala Tyr Gln Ala Thr Val 770 775 780	4153
tgc gcc agg gct cag gct cca cct cca tcg tgg gac caa atg tgg aag Cys Ala Arg Ala Gln Ala Pro Pro Pro Ser Trp Asp Gln Met Trp Lys 785 790 795 800	4201
tgt ctc ata cgg cta aag cct acg ctg cac ggg cca acg ccc ctg ctg Cys Leu Ile Arg Leu Lys Pro Thr Leu His Gly Pro Thr Pro Leu Leu 805 810 815	4249
tat agg ctg gga gcc gtt caa aac gag gtt act acc aca cac ccc ata Tyr Arg Leu Gly Ala Val Gln Asn Glu Val Thr Thr Thr His Pro Ile 820 825 830	4297

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acc aaa tac atc atg gca tgc atg tcg gct gac ctg gag gtc gtc acg		4345
Thr Lys Tyr Ile Met Ala Cys Met Ser Ala Asp Leu Glu Val Val Thr		
835 840 845		
agc acc tgg gtg ctg gta ggc gga gtc cta gca gct ctg gcc gcg tat		4393
Ser Thr Trp Val Leu Val Gly Gly Val Leu Ala Ala Leu Ala Ala Tyr		
850 855 860		
tgc ctg aca aca ggc agc gtg gtc att gtg ggc agg atc atc ttg tcc		4441
Cys Leu Thr Thr Gly Ser Val Val Ile Val Gly Arg Ile Ile Leu Ser		
865 870 875 880		
gga agg ccg gcc atc att ccc gac agg gaa gtc ctt tac cgg gag ttc		4489
Gly Arg Pro Ala Ile Ile Pro Asp Arg Glu Val Leu Tyr Arg Glu Phe		
885 890 895		
gat gag atg gaa gag tgc gcc tca cac ctc cct tac atc gaa cag gga		4537
Asp Glu Met Glu Glu Cys Ala Ser His Leu Pro Tyr Ile Glu Gln Gly		
900 905 910		
atg cag ctc gcc gaa caa ttc aaa cag aag gca atc ggg ttg ctg caa		4585
Met Gln Leu Ala Glu Gln Phe Lys Gln Lys Ala Ile Gly Leu Leu Gln		
915 920 925		
aca gcc acc aag caa gcg gag gct gct gct ccc gtg gtg gaa tcc aag		4633
Thr Ala Thr Lys Gln Ala Glu Ala Ala Ala Pro Val Val Glu Ser Lys		
930 935 940		
tgg cg acc ctc gaa gcc ttc tgg gcg aag cat atg tgg aat ttc atc		4681
Trp Arg Thr Leu Glu Ala Phe Trp Ala Lys His Met Trp Asn Phe Ile		
945 950 955 960		
agc ggg ata caa tat tta gca ggc ttg tcc act ctg cct ggc aac ccc		4729
Ser Gly Ile Gln Tyr Leu Ala Gly Leu Ser Thr Leu Pro Gly Asn Pro		
965 970 975		
gcg ata gca tca ctg atg gca ttc aca gcc tct atc acc agc ccg ctc		4777
Ala Ile Ala Ser Leu Met Ala Phe Thr Ala Ser Ile Thr Ser Pro Leu		
980 985 990		
acc acc caa cat acc ctc ctg ttt aac atc ctg ggg gga tgg gtg gcc		4825
Thr Thr Gln His Thr Leu Leu Phe Asn Ile Leu Gly Gly Trp Val Ala		
995 1000 1005		
gcc caa ctt gct cct ccc agc gct gct tcc gct ttc gta ggc gcc ggc		4873
Ala Gln Leu Ala Pro Pro Ser Ala Ala Ser Ala Phe Val Gly Ala Gly		
1010 1015 1020		
atc gct gga gcg gct gtt ggc agc ata ggc ctt ggg aag gtg ctt gtg		4921
Ile Ala Gly Ala Ala Val Gly Ser Ile Gly Leu Gly Lys Val Leu Val		
1025 1030 1035 1040		
gat att ttg gca ggt tat gga gca ggg gtg gca ggc gcg ctc gtg gcc		4969
Asp Ile Leu Ala Gly Tyr Gly Ala Gly Val Ala Gly Ala Leu Val Ala		
1045 1050 1055		
ttt aag gtc atg agc ggc gag atg ccc tcc acc gag gac ctg gtt aac		5017
Phe Lys Val Met Ser Gly Glu Met Pro Ser Thr Glu Asp Leu Val Asn		
1060 1065 1070		
cta ctc cct gct atc ctc tcc cct ggc gcc cta gtc gtc ggg gtc gtg		5065
Leu Leu Pro Ala Ile Leu Ser Pro Gly Ala Leu Val Val Gly Val Val		
1075 1080 1085		
tgc gca gcg ata ctg cgt cgg cac gtg ggc cca ggg gag ggg gct gtg		5113
Cys Ala Ala Ile Leu Arg Arg His Val Gly Pro Gly Glu Gly Ala Val		
1090 1095 1100		

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cag tgg atg aac cgg ctg ata gcg ttc gct tcg cggt aac cac gtc Gln Trp Met Asn Arg Leu Ile Ala Phe Ala Ser Arg Gly Asn His Val 1105 1110 1115 1120	5161
tcc ccc acg cac tat gtg cct gag agc gac gct gca gca cgt gtc act Ser Pro Thr His Tyr Val Pro Glu Ser Asp Ala Ala Ala Arg Val Thr 1125 1130 1135	5209
cag atc ctc tct agt ctt acc atc act cag ctg ctg aag agg ctt cac Gln Ile Leu Ser Ser Leu Thr Ile Thr Gln Leu Leu Lys Arg Leu His 1140 1145 1150	5257
cag tgg atc aac gag gac tgc tcc acg cca tgc tcc ggc tcg tgg cta Gln Trp Ile Asn Glu Asp Cys Ser Thr Pro Cys Ser Gly Ser Trp Leu 1155 1160 1165	5305
aga gat gtt tgg gat tgg ata tgc acg gtg ttg act gat ttc aag gcc Arg Asp Val Trp Asp Trp Ile Cys Thr Val Leu Thr Asp Phe Lys Ala 1170 1175 1180	5353
tgg ctc cag tcc aag ctc ctg ccg cga ttg ccg gga gtc ccc ttc ttc Trp Leu Gln Ser Lys Leu Leu Pro Arg Leu Pro Gly Val Pro Phe Phe 1185 1190 1195 1200	5401
tca tgt caa cgt ggg tac aag gga gtc tgg ccg ggc gac ggc atc atg Ser Cys Gln Arg Gly Tyr Lys Gly Val Trp Arg Gly Asp Gly Ile Met 1205 1210 1215	5449
caa acc acc tgc cca tgt gga gca cag atc acc gga cat gtg aaa aac Gln Thr Thr Cys Pro Cys Gly Ala Gln Ile Thr Gly His Val Lys Asn 1220 1225 1230	5497
tgt tcc atg agg atc gtg ggg cct agg acc tgt agt aac acg tgg cat Cys Ser Met Arg Ile Val Gly Pro Arg Thr Cys Ser Asn Thr Trp His 1235 1240 1245	5545
gga aca ttc ccc att aac gcg tac acc acg ggc ccc tgc acg ccc tcc Gly Thr Phe Pro Ile Asn Ala Tyr Thr Thr Gly Pro Cys Thr Pro Ser 1250 1255 1260	5593
ccg gcg cca aat tat tct agg gcg ctg tgg ccg gtg gct gct gag gag Pro Ala Pro Asn Tyr Ser Arg Ala Leu Trp Arg Val Ala Ala Glu Glu 1265 1270 1275 1280	5641
tac gtg gag gtt acg cga gtg ggg gat ttc cac tac gtg acg ggc atg Tyr Val Glu Val Thr Arg Val Gly Asp Phe His Tyr Val Thr Gly Met 1285 1290 1295	5689
acc act gac aac gta aag tgc ccg tgt cag gtt ccg gcc ccc gaa ttc Thr Thr Asp Asn Val Lys Cys Pro Cys Gln Val Pro Ala Pro Glu Phe 1300 1305 1310	5737
ttc aca gaa gtg gat ggg gtg ccg ttg cac agg tac gct cca gcg tgc Phe Thr Glu Val Asp Gly Val Arg Leu His Arg Tyr Ala Pro Ala Cys 1315 1320 1325	5785
aaa ccc ctc cta cgg gag gag gtc aca ttc ctg gtc ggg ctc aat caa Lys Pro Leu Leu Arg Glu Glu Val Thr Phe Leu Val Gly Leu Asn Gln 1330 1335 1340	5833
tac ctg gtt ggg tca cag ctc cca tgc gag ccc gaa ctg gac gta gca Tyr Leu Val Gly Ser Gln Leu Pro Cys Glu Pro Glu Leu Asp Val Ala 1345 1350 1355 1360	5881
gtg ctc act tcc atg ctc acc gac ccc tcc cac att acg gcg gag acg Val Leu Thr Ser Met Leu Thr Asp Pro Ser His Ile Thr Ala Glu Thr 1365 1370 1375	5929

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gct aag cgt agg ctg gcc agg gga tct ccc ccc tcc ttg gcc agc tca	5977
Ala Lys Arg Arg Leu Ala Arg Gly Ser Pro Pro Ser Leu Ala Ser Ser	
1380 1385 1390	
tca gct agc cag ctg tct gcg cct tcc ttg aag gca aca tgc act acc	6025
Ser Ala Ser Gln Leu Ser Ala Pro Ser Leu Lys Ala Thr Cys Thr Thr	
1395 1400 1405	
cgt cat gac tcc ccg gac gct gac ctc atc gag gcc aac ctc ctg tgg	6073
Arg His Asp Ser Pro Asp Ala Asp Leu Ile Glu Ala Asn Leu Leu Trp	
1410 1415 1420	
cgg cag gag atg ggc ggg aac atc acc cgc gtg gag tca gaa aat aag	6121
Arg Gln Glu Met Gly Gly Asn Ile Thr Arg Val Glu Ser Glu Asn Lys	
1425 1430 1435 1440	
gta gta att ttg gac tct ttc gag ccg ctc caa gcg gag gag gat gag	6169
Val Val Ile Leu Asp Ser Phe Glu Pro Leu Gln Ala Glu Glu Asp Glu	
1445 1450 1455	
agg gaa gta tcc gtt ccg gcg gag atc ctg cgg agg tcc agg aaa ttc	6217
Arg Glu Val Ser Val Pro Ala Glu Ile Leu Arg Arg Ser Arg Lys Phe	
1460 1465 1470	
cct cga gcg atg ccc ata tgg gca cgc ccg gat tac aac cct cca ctg	6265
Pro Arg Ala Met Pro Ile Trp Ala Arg Pro Asp Tyr Asn Pro Pro Leu	
1475 1480 1485	
ttg gag tcc tgg aag gac ccg gac tac gtc cct cca gtg gta cac ggg	6313
Leu Glu Ser Trp Lys Asp Pro Asp Tyr Val Pro Pro Val Val His Gly	
1490 1495 1500	
tgt cca ttg ccg cct gcc aag gcc cct ccg ata cca cct cca cg agg	6361
Cys Pro Leu Pro Pro Ala Lys Ala Pro Pro Ile Pro Pro Pro Arg Arg	
1505 1510 1515 1520	
aag agg acg gtt gtc ctg tca gaa tct acc gtg tct tct gcc ttg gcg	6409
Lys Arg Thr Val Val Leu Ser Glu Ser Thr Val Ser Ser Ala Leu Ala	
1525 1530 1535	
gag ctc gcc aca aag acc ttc ggc agc tcc gaa tcg tcg gcc gtc gac	6457
Glu Leu Ala Thr Lys Thr Phe Gly Ser Ser Glu Ser Ser Ala Val Asp	
1540 1545 1550	
agc ggc acg gca acg gcc tct cct gac cag ccc tcc gac gac ggc gac	6505
Ser Gly Thr Ala Thr Ala Ser Pro Asp Gln Pro Ser Asp Asp Gly Asp	
1555 1560 1565	
gcg gga tcc gac gtt gag tcg tac tcc tcc atg ccc ccc ctt gag ggg	6553
Ala Gly Ser Asp Val Glu Ser Tyr Ser Ser Met Pro Pro Leu Glu Gly	
1570 1575 1580	
gag ccg ggg gat ccc gat ctc agc gac ggg tct tgg tct acc gta agc	6601
Glu Pro Gly Asp Pro Asp Leu Ser Asp Gly Ser Trp Ser Thr Val Ser	
1585 1590 1595 1600	
gag gag gct agt gag gac gtc gtc tgc tcg atg tcc tac aca tgg	6649
Glu Glu Ala Ser Glu Asp Val Val Cys Cys Ser Met Ser Tyr Thr Trp	
1605 1610 1615	
acg ggc gcc ctg atc acg cca tgc gct gcg gag gaa acc aac ctg ccc	6697
Thr Gly Ala Leu Ile Thr Pro Cys Ala Ala Glu Glu Thr Lys Leu Pro	
1620 1625 1630	
atc aat gca ctg agc aac tct ttg ctc cgt cac cac aac ttg gtc tat	6745
Ile Asn Ala Leu Ser Asn Ser Leu Leu Arg His His Asn Leu Val Tyr	
1635 1640 1645	

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gct aca aca tct cgc agc gca agc ctg cgg cag aag aag gtc acc ttt Ala Thr Thr Ser Arg Ser Ala Ser Leu Arg Gln Lys Lys Val Thr Phe 1650 1655 1660	6793
gac aga ctg cag gtc ctg gac gac cac tac cgg gac gtg ctc aag gag Asp Arg Leu Gln Val Leu Asp Asp His Tyr Arg Asp Val Leu Lys Glu 1665 1670 1675 1680	6841
atg aag gcg aag gcg tcc aca gtt aag gct aaa ctt cta tcc gtg gag Met Lys Ala Lys Ala Ser Thr Val Lys Ala Lys Leu Leu Ser Val Glu 1685 1690 1695	6889
gaa gcc tgt aag ctg acg ccc cca cat tcg gcc aga tct aaa ttt ggc Glu Ala Cys Lys Leu Thr Pro His Ser Ala Arg Ser Lys Phe Gly 1700 1705 1710	6937
tat ggg gca aag gac gtc cgg aac cta tcc agc aag gcc gtt aac cac Tyr Gly Ala Lys Asp Val Arg Asn Leu Ser Ser Lys Ala Val Asn His 1715 1720 1725	6985
atc cgc tcc gtg tgg aag gac ttg ctg gaa gac act gag aca cca att Ile Arg Ser Val Trp Lys Asp Leu Leu Glu Asp Thr Glu Thr Pro Ile 1730 1735 1740	7033
gac acc acc atc atg gca aaa aat gag gtt ttc tgc gtc caa cca gag Asp Thr Thr Ile Met Ala Lys Asn Glu Val Phe Cys Val Gln Pro Glu 1745 1750 1755 1760	7081
aag ggg ggc cgc aag cca gct cgc ctt atc gta ttc cca gat ttg ggg Lys Gly Arg Lys Pro Ala Arg Leu Ile Val Phe Pro Asp Leu Gly 1765 1770 1775	7129
gtt cgt gtg tgc gag aaa atg gcc ctt tac gat gtg gtc tcc acc ctc Val Arg Val Cys Glu Lys Met Ala Leu Tyr Asp Val Val Ser Thr Leu 1780 1785 1790	7177
cct cag gcc gtg atg ggc tct tca tac gga ttc caa tac tct cct gga Pro Gln Ala Val Met Gly Ser Ser Tyr Gly Phe Gln Tyr Ser Pro Gly 1795 1800 1805	7225
cag cgg gtc gag ttc ctg gtg aat gcc tgg aaa gcg aag aaa tgc cct Gln Arg Val Glu Phe Leu Val Asn Ala Trp Lys Ala Lys Lys Cys Pro 1810 1815 1820	7273
atg ggc ttc gca tat gac acc cgc tgt ttt gac tca acg gtc act gag Met Gly Phe Ala Tyr Asp Thr Arg Cys Phe Asp Ser Thr Val Thr Glu 1825 1830 1835 1840	7321
aat gac atc cgt gtt gag gag tca atc tac caa tgt tgt gac ttg gcc Asn Asp Ile Arg Val Glu Glu Ser Ile Tyr Gln Cys Cys Asp Leu Ala 1845 1850 1855	7369
ccc gaa gcc aga cag gcc ata agg tcg ctc aca gag cgg ctt tac atc Pro Glu Ala Arg Gln Ala Ile Arg Ser Leu Thr Glu Arg Leu Tyr Ile 1860 1865 1870	7417
ggg ggc ccc ctg act aat tct aaa ggg cag aac tgc ggc tat cgc cgg Gly Gly Pro Leu Thr Asn Ser Lys Gly Gln Asn Cys Gly Tyr Arg Arg 1875 1880 1885	7465
tgc cgc gcg agc ggt gta ctg acg acc agc tgc ggt aat acc ctc aca Cys Arg Ala Ser Gly Val Leu Thr Thr Ser Cys Gly Asn Thr Leu Thr 1890 1895 1900	7513
tgt tac ttg aag gcc gct gcg gcc tgt cga gct gcg aag ctc cag gac Cys Tyr Leu Lys Ala Ala Ala Cys Arg Ala Ala Lys Leu Gln Asp 1905 1910 1915 1920	7561

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tgc acg atg ctc gta tgc gga gac gac ctt gtc gtt atc tgt gaa agc Cys Thr Met Leu Val Cys Gly Asp Asp Leu Val Val Ile Cys Glu Ser 1925 1930 1935	7609
gcg ggg acc caa gag gac gag gcg agc cta cg ^g gcc ttc acg gag gct Ala Gly Thr Gln Glu Asp Glu Ala Ser Leu Arg Ala Phe Thr Glu Ala 1940 1945 1950	7657
atg act aga tac tct gcc ccc cct ggg gac cc ^g ccc aaa cca gaa tac Met Thr Arg Tyr Ser Ala Pro Pro Gly Asp Pro Pro Lys Pro Glu Tyr 1955 1960 1965	7705
gac ttg gag ttg ata aca tca tgc tcc tcc aat gtg tca gtc gcg cac Asp Leu Glu Leu Ile Thr Ser Cys Ser Ser Asn Val Ser Val Ala His 1970 1975 1980	7753
gat gca tct ggc aaa agg gtg tac tat ctc acc cgt gac ccc acc acc Asp Ala Ser Gly Lys Arg Val Tyr Tyr Leu Thr Arg Asp Pro Thr Thr 1985 1990 1995 2000	7801
ccc ctt gc ^g cg ^g gct gc ^g tgg gag aca gct aga cac act cca gtc aat Pro Leu Ala Arg Ala Ala Trp Glu Thr Ala Arg His Thr Pro Val Asn 2005 2010 2015	7849
tcc tgg cta ggc aac atc atc atg tat gc ^g ccc acc ttg tgg gca agg Ser Trp Leu Gly Asn Ile Ile Met Tyr Ala Pro Thr Leu Trp Ala Arg 2020 2025 2030	7897
atg atc ctg atg act cat ttc ttc tcc atc ctt cta gct cag gaa caa Met Ile Leu Met Thr His Phe Phe Ser Ile Leu Leu Ala Gln Glu Gln 2035 2040 2045	7945
ctt gaa aaa gcc cta gat tgt cag atc tac ggg gc ^g tgc tcc att Leu Glu Lys Ala Leu Asp Cys Gln Ile Tyr Gly Ala Cys Tyr Ser Ile 2050 2055 2060	7993
gag cca ctt gac cta cct cag atc att caa cga ctc cac gg ^g ctt agc Glu Pro Leu Asp Leu Pro Gln Ile Ile Gln Arg Leu His Gly Leu Ser 2065 2070 2075 2080	8041
gca ttt tca ctc cat agt tac tct cca ggt gag atc aat agg gtg gct Ala Phe Ser Leu His Ser Tyr Ser Pro Gly Glu Ile Asn Arg Val Ala 2085 2090 2095	8089
tca tgc ctc agg aaa ctt ggg gta cc ^g ccc ttg cga gtc tgg aga cat Ser Cys Leu Arg Lys Leu Gly Val Pro Pro Leu Arg Val Trp Arg His 2100 2105 2110	8137
cg ^g gcc aga agt gtc cgc gct agg cta ctg tcc cag ggg ggg agg gct Arg Ala Arg Ser Val Arg Ala Arg Leu Leu Ser Gln Gly Gly Arg Ala 2115 2120 2125	8185
gcc act tgt ggc aag tac ctc ttc aac tgg gca gta agg acc aag ctc Ala Thr Cys Gly Lys Tyr Leu Phe Asn Trp Ala Val Arg Thr Lys Leu 2130 2135 2140	8233
aaa ctc act cca atc cc ^g gct gc ^g tcc cag ttg gat tta tcc agc tgg Lys Leu Thr Pro Ile Pro Ala Ala Ser Gln Leu Asp Leu Ser Ser Trp 2145 2150 2155 2160	8281
ttc gtt gct ggt tac agc ggg gga gac ata tat cac agc ctg tct cgt Phe Val Ala Gly Tyr Ser Gly Gly Asp Ile Tyr His Ser Leu Ser Arg 2165 2170 2175	8329
gcc cga ccc cgc tgg ttc atg tgg tgc cta ctc cta ctt tct gta ggg Ala Arg Pro Arg Trp Phe Met Trp Cys Leu Leu Leu Ser Val Gly 2180 2185 2190	8377

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gta ggc atc tat cta ctc ccc aac cga tga acggggagct aaacactcca	8427
Val Gly Ile Tyr Leu Leu Pro Asn Arg *	
2195	2200

ggccaatagg ccatcctgtt tttcccttt ttttttttt ttttttttt ttttttttt 8487	
ttttttttt ttttttttt tttcctttt tcccaatttt ttccctttt tttccctttgg 8547	
tggctccatc ttagccctag tcacggctag ctgtgaaagg tccgtgagcc gcttgactgc 8607	
agagagtgct gatactggcc tctctgcaga tcaagt 8643	

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<211> 8648
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<213> HCV

<220>
<221> CDS
<222> (1802)...(8407)

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ccccctccccc gggagagcca tagtgtctg cgaaaccggg gagtacaccg gaattgccag 180	
gacgaccggg tccttcttg gatcaacccg ctcatacgct ggagatttg gggtggccccc 240	
gcgagactgc tagccagata gtgttgggtc gcgaaaggcc ttgtgtact gcctgatagg 300	
gtgcttcgca gtgccccggg aggtctcgat gaccgtgcac catgagcacg aatcctaaac 360	
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cggcccttg ggtggagagg ctattcggtc atgactggc acaacagaca atcggtctg 480	
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acctgtccgg tgccctgaat gaactgcagg acgaggcagc gcccgtatcg tggctggcca 600	
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gaaccccccac cttggcgaca ggtgcctctg cggccaaaag ccacgtgtat aagatacacc 1560	
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c atg gac cgg gag atg gca gca tcg tgc gga ggc gcg gtt ttc gta ggt 1849	
Met Asp Arg Glu Met Ala Ala Ser Cys Gly Gly Ala Val Phe Val Gly	
1 5 10 15	

ctg ata ctc ttg acc ttg tca ccg cac tat aag ctg ttc ctc gct agg 1897	
Leu Ile Leu Leu Thr Leu Ser Pro His Tyr Lys Leu Phe Leu Ala Arg	
20 25 30	

ctc ata tgg tgg tta caa tat ttt atc acc agg gcc gag gca cac ttg 1945	
Leu Ile Trp Trp Leu Gln Tyr Phe Ile Thr Arg Ala Glu Ala His Leu	
35 40 45	

caa gtg tgg atc ccc ccc ctc aac gtt cgg ggg ggc cgc gat gcc gtc 1993	
Gln Val Trp Ile Pro Pro Leu Asn Val Arg Gly Gly Arg Asp Ala Val	
50 55 60	

atc ctc ctc acg tgc gcg atc cac cca gag cta atc ttt acc atc acc 2041	
Ile Leu Leu Thr Cys Ala Ile His Pro Glu Leu Ile Phe Thr Ile Thr	

13-083-3-D2-SQL-Substitute-(12-28-05).txt 70 75 80

aaa atc ttg ctc gcc ata ctc ggt cca ctc atg gtg ctc cag gct ggt	Lys Ile Leu Leu Ala Ile Leu Gly Pro Leu Met Val Leu Gln Ala Gly	85 90 95	2089
ata acc aaa gtg ccg tac ttc gtg cgc gca cac ggg ctc att cgt gca	Ile Thr Lys Val Pro Tyr Phe Val Arg Ala His Gly Leu Ile Arg Ala	100 105 110	2137
tgc atg ctg gtg cggt aag gtt gct ggg ggt cat tat gtc caa atg gct	Cys Met Leu Val Arg Lys Val Ala Gly Gly His Tyr Val Gln Met Ala	115 120 125	2185
ctc atg aag ttg gcc gca ctg aca ggt acg tac gtt tat gac cat ctc	Leu Met Lys Leu Ala Ala Leu Thr Gly Thr Tyr Val Tyr Asp His Leu	130 135 140	2233
acc cca ctg cggt gac tgg gcc cac gcg cta cga gac ctt gcg gtc	Thr Pro Leu Arg Asp Trp Ala His Ala Gly Leu Arg Asp Leu Ala Val	145 150 155 160	2281
gca gtt gag ccc gtc gtc ttc tct gat atg gag acc aag gtt atc acc	Ala Val Glu Pro Val Val Phe Ser Asp Met Glu Thr Lys Val Ile Thr	165 170 175	2329
tgg ggg gca gac acc gcg gcg tgt ggg gac atc atc ttg ggc ctg ccc	Trp Gly Ala Asp Thr Ala Ala Cys Gly Asp Ile Ile Leu Gly Leu Pro	180 185 190	2377
gtc tcc gcc cgc agg ggg agg gag ata cat ctg gga ccg gca gac agc	Val Ser Ala Arg Arg Gly Arg Ile His Leu Gly Pro Ala Asp Ser	195 200 205	2425
ctt gaa ggg cag ggg tgg cga ctc ctc gcg cct att acg gcc tac tcc	Leu Glu Gly Gln Gly Trp Arg Leu Leu Ala Pro Ile Thr Ala Tyr Ser	210 215 220	2473
caa cag acg cga ggc cta ctt ggc tgc atc atc act agc ctc aca ggc	Gln Gln Thr Arg Gly Leu Leu Gly Cys Ile Ile Thr Ser Leu Thr Gly	225 230 235 240	2521
cgg gac agg aac cag gtc gag ggg gag gtc caa gtg gtc tcc acc gca	Arg Asp Arg Asn Gln Val Glu Gly Glu Val Gln Val Val Ser Thr Ala	245 250 255	2569
aca caa tct ttg ctg gcg acc tgc gtc aat ggc gtg tgt tgg act gtc	Thr Gln Ser Phe Leu Ala Thr Cys Val Asn Gly Val Cys Trp Thr Val	260 265 270	2617
tat cat ggt gcc ggc tca aag acc ctt gcc ggc cca aag ggc cca atc	Tyr His Gly Ala Gly Ser Lys Thr Leu Ala Gly Pro Lys Gly Pro Ile	275 280 285	2665
acc caa atg tac acc aat gtg gac cag gac ctc gtc ggc tgg caa gcg	Thr Gln Met Tyr Thr Asn Val Asp Gln Asp Leu Val Gly Trp Gln Ala	290 295 300	2713
ccc ccc ggg gcg cgt tcc ttg aca cca tgc acc tgc ggc agc tcg gac	Pro Pro Gly Ala Arg Ser Leu Thr Pro Cys Thr Cys Gly Ser Ser Asp	305 310 315 320	2761
ctt tac ttg gtc acg agg cat gcc gat gtc att ccg gtg cgc cgg cgg	Leu Tyr Leu Val Thr Arg His Ala Asp Val Ile Pro Val Arg Arg Arg	325 330 335	2809
ggc gac agc agg ggg agc cta ctc tcc ccc agg ccc gtc tcc tac ttg	Gly Asp Ser Arg Gly Ser Leu Leu Ser Pro Arg Pro Val Ser Tyr Leu	335 340	2857

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340

345

350

aag ggc tct tcg ggc ggt cca ctg ctc tgc ccc tcg ggg cac gct gtg Lys Gly Ser Ser Gly Gly Pro Leu Leu Cys Pro Ser Gly His Ala Val 355	2905
ggc atc ttt cgg gct gcc gtg tgc acc cgg ggg gtt gcg aag gcg gtg Gly Ile Phe Arg Ala Ala Val Cys Thr Arg Gly Val Ala Lys Ala Val 370 375 380	2953
gac ttt gta ccc gtc gag tct atg gga acc act atg cgg tcc ccg gtc Asp Phe Val Pro Val Glu Ser Met Gly Thr Thr Met Arg Ser Pro Val 385 390 395 400	3001
ttc acg gac aac tcg tcc cct ccg gcc gta ccg cag aca ttc cag gtg Phe Thr Asp Asn Ser Ser Pro Pro Ala Val Pro Gln Thr Phe Gln Val 405 410 415	3049
gcc cat cta cac gcc cct act ggt agc ggc aag agc act aag gtg ccg Ala His Leu His Ala Pro Thr Gly Ser Gly Lys Ser Thr Lys Val Pro 420 425 430	3097
gct gcg tat gca gcc caa ggg tat aag gtg ctt gtc ctg aac ccg tcc Ala Ala Tyr Ala Ala Gln Gly Tyr Lys Val Leu Val Leu Asn Pro Ser 435 440 445	3145
gtc gcc gcc acc cta ggt ttc ggg gcg tat atg tct aag gca cat ggt Val Ala Ala Thr Leu Gly Phe Gly Ala Tyr Met Ser Lys Ala His Gly 450 455 460	3193
atc gac cct aac atc aga acc ggg gta agg acc atc acc acg ggt gcc Ile Asp Pro Asn Ile Arg Thr Gly Val Arg Thr Ile Thr Thr Gly Ala 465 470 475 480	3241
ccc atc acg tac tcc acc tat ggc aag ttt ctt gcc gac ggt ggt tgc Pro Ile Thr Tyr Ser Thr Tyr Gly Lys Phe Leu Ala Asp Gly Gly Cys 485 490 495	3289
tct ggg ggc gcc tat gac atc ata ata tgt gat gag tgc cac tca act Ser Gly Gly Ala Tyr Asp Ile Ile Ile Cys Asp Glu Cys His Ser Thr 500 505 510	3337
gac tcg acc act atc ctg ggc atc ggc aca gtc ctg gac caa gcg gag Asp Ser Thr Thr Ile Leu Gly Ile Gly Thr Val Leu Asp Gln Ala Glu 515 520 525	3385
acg gct gga gcg cga ctc gtc gtg ctc gcc acc gct acg cct ccg gga Thr Ala Gly Ala Arg Leu Val Val Leu Ala Thr Ala Thr Pro Pro Gly 530 535 540	3433
tcg gtc acc gtg cca cat cca aac atc gag gag gtg gct ctg tcc agc Ser Val Thr Val Pro His Pro Asn Ile Glu Glu Val Ala Leu Ser Ser 545 550 555 560	3481
act gga gaa atc ccc ttt tat ggc aaa gcc atc ccc atc gag acc atc Thr Gly Glu Ile Pro Phe Tyr Gly Lys Ala Ile Pro Ile Glu Thr Ile 565 570 575	3529
aag ggg ggg agg cac ctc att ttc tgc cat tcc aag aag aaa tgt gat Lys Gly Gly Arg His Leu Ile Phe Cys His Ser Lys Lys Lys Cys Asp 580 585 590	3577
gag ctc gcc gcg aag ctg tcc ggc ctc gga ctc aat gct gta gca tat Glu Leu Ala Ala Lys Leu Ser Gly Leu Gly Leu Asn Ala Val Ala Tyr 595 600 605	3625
tac cggtt ggc ctt gat gta tcc gtc atc cca act agc gga gac gtc att Tyr Arg Gly Leu Asp Val Ser Val Ile Pro Thr Ser Gly Asp Val Ile	3673

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 610 615 620

gtc gta gca acg gac gct cta atg acg ggc ttt acc ggc gat ttc gac	3721
Val Val Ala Thr Asp Ala Leu Met Thr Gly Phe Thr Gly Asp Phe Asp	
625 630 635 640	
tca gtg atc gac tgc aat aca tgt gtc acc cag aca gtc gac ttc agc	3769
Ser Val Ile Asp Cys Asn Thr Cys Val Thr Gln Thr Val Asp Phe Ser	
645 650 655	
ctg gac ccg acc ttc acc att gag acg acg acc gtc cca caa gac gcg	3817
Leu Asp Pro Thr Phe Thr Ile Glu Thr Thr Thr Val Pro Gln Asp Ala	
660 665 670	
gtg tca cgc tcg cag cgg cga ggc agg act ggt agg ggc agg atg ggc	3865
Val Ser Arg Ser Gln Arg Arg Gly Arg Thr Gly Arg Gln Arg Met Gly	
675 680 685	
att tac agg ttt gtg act cca gga gaa cgg ccc tcg ggc atg ttc gat	3913
Ile Tyr Arg Phe Val Thr Pro Gly Glu Arg Pro Ser Gly Met Phe Asp	
690 695 700	
tcc tcg gtt ctg tgc gag tgc tat gac gcg ggc tgt gct tgg tac gag	3961
Ser Ser Val Leu Cys Glu Cys Tyr Asp Ala Gly Cys Ala Trp Tyr Glu	
705 710 715 720	
ctc acg ccc gcc gag acc tca gtt agg ttg cgg gct tac cta aac aca	4009
Leu Thr Pro Ala Glu Thr Ser Val Arg Leu Arg Ala Tyr Leu Asn Thr	
725 730 735	
cca ggg ttg ccc gtc tgc cag gac cat ctg gag ttc tgg gag agc gtc	4057
Pro Gly Leu Pro Val Cys Gln Asp His Leu Glu Phe Trp Glu Ser Val	
740 745 750	
ttt aca ggc ctc acc cac ata gac gcc cat ttc ttg tcc cag act aag	4105
Phe Thr Gly Leu Thr His Ile Asp Ala His Phe Leu Ser Gln Thr Lys	
755 760 765	
cag gca gga gac aac ttc ccc tac ctg gta gca tac cag gct acg gtg	4153
Gln Ala Gly Asp Asn Phe Pro Tyr Leu Val Ala Tyr Gln Ala Thr Val	
770 775 780	
tgc gcc agg gct cag gct cca cct cca tcg tgg gac caa atg tgg aag	4201
Cys Ala Arg Ala Gln Ala Pro Pro Pro Ser Trp Asp Gln Met Trp Lys	
785 790 795 800	
tgt ctc ata cgg cta aag cct acg ctg cac ggg cca acg ccc ctg ctg	4249
Cys Leu Ile Arg Leu Lys Pro Thr Leu His Gly Pro Thr Pro Leu Leu	
805 810 815	
tat agg ctg gga gcc gtt caa aac gag gtt act acc aca cac ccc ata	4297
Tyr Arg Leu Gly Ala Val Gln Asn Glu Val Thr Thr Thr His Pro Ile	
820 825 830	
acc aaa tac atc atg gca tgc atg tcg gct gac ctg gag gtc gtc acg	4345
Thr Lys Tyr Ile Met Ala Cys Met Ser Ala Asp Leu Glu Val Val Thr	
835 840 845	
agc acc tgg gtg ctg gta ggc gga gtc cta gca gct ctg gcc gcg tat	4393
Ser Thr Trp Val Leu Val Gly Gly Val Leu Ala Ala Leu Ala Ala Tyr	
850 855 860	
tgc ctg aca aca ggc agc gtg gtc att gtg ggc agg atc atc ttg tcc	4441
Cys Leu Thr Thr Gly Ser Val Val Ile Val Gly Arg Ile Ile Leu Ser	
865 870 875 880	
gga aag ccg gcc atc att ccc gac agg gaa gtc ctt tac cgg gag ttc	4489
Gly Lys Pro Ala Ile Ile Pro Asp Arg Glu Val Leu Tyr Arg Glu Phe	

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885	890	895	
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atg cag ctc gcc gaa caa ttc aaa cag aag gca atc ggg ttg ctg caa Met Gln Leu Ala Glu Gln Phe Lys Gln Lys Ala Ile Gly Leu Leu Gln 915 920 925			4585
aca gcc acc aag caa gcg gag gct gct gct ccc gtg gtg gaa tcc aag Thr Ala Thr Lys Gln Ala Glu Ala Ala Ala Pro Val Val Glu Ser Lys 930 935 940			4633
tgg cgg acc ctc gaa gcc ttc tgg gcg aag cat atg tgg aat ttc atc Trp Arg Thr Leu Glu Ala Phe Trp Ala Lys His Met Trp Asn Phe Ile 945 950 955 960			4681
agc ggg ata caa tat tta gca ggc ttg tcc act ctg cct ggc aac ccc Ser Gly Ile Gln Tyr Leu Ala Gly Leu Ser Thr Leu Pro Gly Asn Pro 965 970 975			4729
gcg ata gca tca ctg atg gca ttc aca gcc tct atc acc agc ccg ctc Ala Ile Ala Ser Leu Met Ala Phe Thr Ala Ser Ile Thr Ser Pro Leu 980 985 990			4777
acc acc caa cat acc ctc ctg ttt aac atc ctg ggg gga tgg gtg gcc Thr Thr Gln His Thr Leu Leu Phe Asn Ile Leu Gly Gly Trp Val Ala 995 1000 1005			4825
gcc caa ctt gct cct ccc agc gct gct tct gct ttc gta ggc gcc ggc Ala Gln Leu Ala Pro Pro Ser Ala Ala Ser Ala Phe Val Gly Ala Gly 1010 1015 1020			4873
atc gct gga gcg gct gtt ggc agc ata ggc ctt ggg aag gtg ctt gtg Ile Ala Gly Ala Ala Val Gly Ser Ile Gly Leu Gly Lys Val Leu Val 1025 1030 1035 1040			4921
gat att ttg gca ggt tat gga gca ggg gtg gca ggc gcg ctc gtg gcc Asp Ile Leu Ala Gly Tyr Gly Ala Gly Val Ala Gly Ala Leu Val Ala 1045 1050 1055			4969
ttt aag gtc atg agc ggc gag atg ccc tcc acc gag gac ctg gtt aac Phe Lys Val Met Ser Gly Glu Met Pro Ser Thr Glu Asp Leu Val Asn 1060 1065 1070			5017
cta ctc cct gct atc ctc tcc cct ggc gcc cta gtc gtc ggg gtc gtg Leu Leu Pro Ala Ile Leu Ser Pro Gly Ala Leu Val Val Gly Val Val 1075 1080 1085			5065
tgc gca gcg ata ctg cgt cgg cac gtg ggc cca ggg gag ggg gct gtg Cys Ala Ala Ile Leu Arg Arg His Val Gly Pro Gly Glu Gly Ala Val 1090 1095 1100			5113
cag tgg atg aac cgg ctg ata gcg ttc gct tcg cgg ggt aac cac gtc Gln Trp Met Asn Arg Leu Ile Ala Phe Ala Ser Arg Gly Asn His Val 1105 1110 1115 1120			5161
tcc ccc acg cac tat gtg cct gag agc gac gct gca gca cgt gtc act Ser Pro Thr His Tyr Val Pro Glu Ser Asp Ala Ala Ala Arg Val Thr 1125 1130 1135			5209
cag atc ctc tct agt ctt acc atc act cag ctg ctg aag agg ctt cac Gln Ile Leu Ser Ser Leu Thr Ile Thr Gln Leu Leu Lys Arg Leu His 1140 1145 1150			5257
cag tgg atc aac gag gac tgc tcc acg cca tgc tcc ggc tcg tgg cta Gln Trp Ile Asn Glu Asp Cys Ser Thr Pro Cys Ser Gly Ser Trp Leu			5305

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1160 1165

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1425	1430	1435	1440
gta gta att ttg gac tct ttc gag ccg ctc caa gcg gag gag gat gag Val Val Ile Leu Asp Ser Phe Glu Pro Leu Gln Ala Glu Glu Asp Glu 1445 1450 1455			6169
agg gaa gta tcc gtt ccg gcg gag atc ctg cg ^g agg tcc agg aaa ttc Arg Glu Val Ser Val Pro Ala Glu Ile Leu Arg Arg Ser Arg Lys Phe 1460 1465 1470			6217
cct cga gcg atg ccc ata tgg gca cgc ccg gat tac aac cct cca ctg Pro Arg Ala Met Pro Ile Trp Ala Arg Pro Asp Tyr Asn Pro Pro Leu 1475 1480 1485			6265
tta gag tcc tgg aag gac ccg gac tac gtc cct cca gtg gta cac ggg Leu Glu Ser Trp Lys Asp Pro Asp Tyr Val Pro Pro Val Val His Gly 1490 1495 1500			6313
tgt cca ttg ccg cct gcc aag gcc cct ccg ata cca cct cca ccg agg Cys Pro Leu Pro Ala Lys Ala Pro Pro Ile Pro Pro Pro Arg Arg 1505 1510 1515 1520			6361
aag agg acg gtt gtc ctg tca gaa tct acc gtg tct tct gcc ttg gcg Lys Arg Thr Val Val Leu Ser Glu Ser Thr Val Ser Ser Ala Leu Ala 1525 1530 1535			6409
gag ctc gcc aca aag acc ttc ggc agc tcc gaa tcg tcg gcc gtc gac Glu Leu Ala Thr Lys Thr Phe Gly Ser Ser Glu Ser Ser Ala Val Asp 1540 1545 1550			6457
agc ggc acg gca acg gcc tct cct gac cag ccc tcc gac gac ggc gac Ser Gly Thr Ala Thr Ala Ser Pro Asp Gln Pro Ser Asp Asp Gly Asp 1555 1560 1565			6505
gcg gga tcc gac gtt gag tcg tac tcc tcc atg ccc ccc ctt gag ggg Ala Gly Ser Asp Val Glu Ser Tyr Ser Ser Met Pro Pro Leu Glu Gly 1570 1575 1580			6553
gag ccg ggg gat ccc gat ctc agc gac ggg tct tgg tct acc gta agc Glu Pro Gly Asp Pro Asp Leu Ser Asp Gly Ser Trp Ser Thr Val Ser 1585 1590 1595 1600			6601
gag gag gct agt gag gac gtc gtc tgc tcg atg tcc tac aca tgg Glu Glu Ala Ser Glu Asp Val Val Cys Cys Ser Met Ser Tyr Thr Trp 1605 1610 1615			6649
aca ggc gcc ctg atc acg cca tgc gct gcg gag gaa acc aac ctg ccc Thr Gly Ala Leu Ile Thr Pro Cys Ala Ala Glu Glu Thr Lys Leu Pro 1620 1625 1630			6697
atc aat gca ctg agc aac tct ttg ctc cgt cac cac aac ttg gtc tat Ile Asn Ala Leu Ser Asn Ser Leu Leu Arg His His Asn Leu Val Tyr 1635 1640 1645			6745
gct aca aca tct cgc agc gca agc ctg cgg cag aag aag gtc acc ttt Ala Thr Thr Ser Arg Ser Ala Ser Leu Arg Gln Lys Lys Val Thr Phe 1650 1655 1660			6793
gac aga ctg cag gtc ctg gac gac cac tac cgg gac gtg ctc aag gag Asp Arg Leu Gln Val Leu Asp Asp His Tyr Arg Asp Val Leu Lys Glu 1665 1670 1675 1680			6841
atg aag gcg aag gcg tcc aca gtt aag gct aaa ctt cta tcc gtg gag Met Lys Ala Lys Ala Ser Thr Val Lys Ala Lys Leu Leu Ser Val Glu 1685 1690 1695			6889
gaa gcc tgt aag ctg acg ccc cca cat tcg gcc aga tct aaa ttt ggc Glu Ala Cys Lys Leu Thr Pro Pro His Ser Ala Arg Ser Lys Phe Gly			6937

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 1700 1705 1710

tat	ggg	gca	aag	gac	gtc	cgg	aac	cta	tcc	agc	aag	gcc	gtt	aac	cac		6985
Tyr	Gly	Ala	Lys	Asp	Val	Arg	Asn	Leu	Ser	Ser	Lys	Ala	Val	Asn	His		
1715					1720						1725						
atc	cgc	tcc	gtg	tgg	aag	gac	ttg	ctg	gaa	gac	act	gag	aca	cca	att		7033
Ile	Arg	Ser	Val	Trp	Lys	Asp	Leu	Leu	Glu	Asp	Thr	Glu	Thr	Pro	Ile		
	1730				1735						1740						
gac	acc	acc	atc	atg	gca	aaa	aat	gag	gtt	ttc	tgc	gtc	caa	cca	gag		7081
Asp	Thr	Thr	Ile	Met	Ala	Lys	Asn	Glu	Val	Phe	Cys	Val	Gln	Pro	Glu		
	1745				1750					1755					1760		
aag	ggg	ggc	cgc	aag	cca	gct	cgc	ctt	atc	gta	ttc	cca	gat	ttg	ggg		7129
Lys	Gly	Gly	Arg	Lys	Pro	Ala	Arg	Leu	Ile	Val	Phe	Pro	Asp	Leu	Gly		
	1765							1770						1775			
gtt	cgt	gtg	tgc	gag	aaa	atg	gcc	ctt	tac	gat	gtg	gtc	tcc	acc	ctc		7177
Val	Arg	Val	Cys	Glu	Lys	Met	Ala	Leu	Tyr	Asp	Val	Val	Ser	Thr	Leu		
	1780					1785					1790						
cct	cag	gcc	gtg	atg	ggc	tct	tca	tac	gga	ttc	caa	tac	tct	cct	gga		7225
Pro	Gln	Ala	Val	Met	Gly	Ser	Ser	Tyr	Gly	Phe	Gln	Tyr	Ser	Pro	Gly		
	1795					1800					1805						
cag	cg	gtc	gag	ttc	ctg	gtg	aat	gct	tgg	aaa	gcg	aag	aaa	tgc	cct		7273
Gln	Arg	Val	Glu	Phe	Leu	Val	Asn	Ala	Trp	Lys	Ala	Lys	Lys	Cys	Pro		
	1810				1815					1820							
atg	ggc	ttc	gca	tat	gac	acc	cgc	tgt	ttt	gac	tca	acg	gtc	act	gag		7321
Met	Gly	Phe	Ala	Tyr	Asp	Thr	Arg	Cys	Phe	Asp	Ser	Thr	Val	Thr	Glu		
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aat	gac	atc	cgt	gtt	gag	gag	tca	atc	tac	caa	tgt	tgt	gac	ttg	gcc		7369
Asn	Asp	Ile	Arg	Val	Glu	Glu	Ser	Ile	Tyr	Gln	Cys	Cys	Asp	Leu	Ala		
	1845							1850						1855			
ccc	gaa	gcc	aga	cag	gcc	ata	agg	tcg	ctc	aca	gag	cgg	ctt	tac	atc		7417
Pro	Glu	Ala	Arg	Gln	Ala	Ile	Arg	Ser	Leu	Thr	Glu	Arg	Leu	Tyr	Ile		
	1860					1865					1870						
ggg	ggc	ccc	ctg	act	aat	tct	aaa	ggg	cag	aac	tgc	ggc	tat	cgc	cgg		7465
Gly	Gly	Pro	Leu	Thr	Asn	Ser	Lys	Gly	Gly	Gln	Asn	Cys	Gly	Tyr	Arg	Arg	
	1875					1880					1885						
tgc	cgc	gag	gg	gt	ct	ac	cc	ag	tc	g	tt	at	cc	ct	ac		7513
Cys	Arg	Ala	Ser	Gly	Val	Leu	Thr	Thr	Ser	Cys	Gly	Asn	Thr	Leu	Thr		
	1890				1895					1900							
tgt	ta	tt	a	ag	g	cc	g	cc	t	cg	g	ct	c	c	g	ac	7561
Cys	Tyr	Leu	Lys	Ala	Ala	Ala	Ala	Cys	Arg	Ala	Ala	Lys	Leu	Gln	Asp		
	1905				1910					1915					1920		
tgc	ac	at	ct	gt	tg	gg	g	ac	g	ct	gt	at	tc	t	g	ac	7609
Cys	Thr	Met	Leu	Val	Cys	Gly	Asp	Asp	Leu	Val	Val	Ile	Cys	Glu	Ser		
	1925					1930						1935					
gcg	gg	ac	ca	ga	ga	g	gc	ag	ct	cg	gc	tt	ac	g	gt		7657
Ala	Gly	Thr	Gln	Glu	Asp	Glu	Ala	Ser	Leu	Arg	Ala	Phe	Thr	Glu	Ala		
	1940				1945					1950							
atg	act	aga	ta	tct	gcc	ccc	cct	ggg	gac	ccg	ccc	aaa	cca	gaa	tac		7705
Met	Thr	Arg	Tyr	Ser	Ala	Pro	Pro	Gly	Asp	Pro	Pro	Lys	Pro	Glu	Tyr		
	1955				1960					1965							
gac	tt	g	ag	tt	at	ac	tca	tgc	tcc	aat	gtg	tca	gtc	gcg	cac		7753
Asp	Leu	Glu	Leu	Ile	Thr	Ser	Cys	Ser	Ser	Asn	Val	Ser	Val	Ala	His		

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Asp Ala Ser Gly Lys Arg Val Tyr Tyr Leu Thr Arg Asp Pro Thr Thr			
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Pro Leu Ala Arg Ala Ala Trp Glu Thr Ala Arg His Thr Pro Val Asn			
2005 2010 2015			
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Ser Trp Leu Gly Asn Ile Ile Met Tyr Ala Pro Thr Leu Trp Ala Arg			
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Met Ile Leu Met Thr His Phe Phe Ser Ile Leu Leu Ala Gln Glu Gln			
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ctt gaa aaa gcc cta gat tgt cag atc tac ggg gcc tgt tac tcc att			7993
Leu Glu Lys Ala Leu Asp Cys Gln Ile Tyr Gly Ala Cys Tyr Ser Ile			
2050 2055 2060			
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Glu Pro Leu Asp Leu Pro Gln Ile Ile Gln Arg Leu His Gly Leu Ser			
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Ala Phe Ser Leu His Ser Tyr Ser Pro Gly Glu Ile Asn Arg Val Ala			
2085 2090 2095			
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Ser Cys Leu Arg Lys Leu Gly Val Pro Pro Leu Arg Val Trp Arg His			
2100 2105 2110			
cgg gcc aga agt gtc cgc gct agg cta ctg tcc cag ggg ggg agg gct			8185
Arg Ala Arg Ser Val Arg Ala Arg Leu Leu Ser Gln Gly Gly Arg Ala			
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gcc act tgt ggc aag tac ctc ttc aac tgg gca gta agg acc aag ctc			8233
Ala Thr Cys Gly Lys Tyr Leu Phe Asn Trp Ala Val Arg Thr Lys Leu			
2130 2135 2140			
aaa ctc act cca atc ccg gct gcg tcc cag ttg gat tta tcc agc tgg			8281
Lys Leu Thr Pro Ile Pro Ala Ala Ser Gln Leu Asp Leu Ser Ser Trp			
2145 2150 2155 2160			
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Phe Val Ala Gly Tyr Ser Gly Gly Asp Ile Tyr His Ser Leu Ser Arg			
2165 2170 2175			
gcc cga ccc cgc tgg ttc acg tgg tgc cta ctc cta ctt tct gta ggg			8377
Ala Arg Pro Arg Trp Phe Thr Trp Cys Leu Leu Leu Ser Val Gly			
2180 2185 2190			
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Val Gly Ile Tyr Leu Leu Pro Asn Arg *			
2195 2200			
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ttgtcgatca	ggatgatctg	gacgaagagc	atcagggct	cgcgcagcc	gaactgttcg	900
ccagggctaa	ggcgcgcatg	cccgcacggc	aggatctcg	cgtgacccat	ggcgatgcct	960
gcttgcgaa	tatcatggtg	gaaaatggcc	gctttctgg	attcatcgac	tgtggccggc	1020
tgggtgtggc	ggaccgcstat	caggacatag	cggtggctac	ccgtgatatt	gctgaagagc	1080
ttggcggcga	atgggctgac	cgcttcctcg	tgctttacgg	tatgcgcgc	cccgattcgc	1140
agcgcatcgc	tttcttatcg	cttgcgtacg	agttcttcg	agttcgcgc	cagatgttaa	1200
cagaccacaa	cgggttccct	ctagcgggat	caattccgc	ccccccctta	acgttactgg	1260
ccgaagccgc	ttgaaataag	gccgggtgtc	gtttgtctat	atgttatttt	ccaccatatt	1320
gccgttttt	ggcaatgtga	gggccccggaa	acctggccct	gtcttcttga	cgagcattcc	1380
taggggtctt	ccccctctcg	ccaaaggaat	gcaaggctcg	ttgaatgtcg	tgaaggaagc	1440
agttcctctg	gaagcttctt	gaagacaaac	aacgtctgt	gcgaccctt	gcaggcagcg	1500
gaacccccc	cctggcgaca	ggtgcctcg	cggccaaaag	ccacgtgtat	aagatacacc	1560
tgcaaaggcg	gcacaacccc	agtgcacgt	tgtgagttgg	atagttgtgg	aaagagtcaa	1620
atggctctcc	tcaagcgat	tcaacaaggg	gctgaaggat	gcccagaagg	tacccattg	1680
tatggatct	gatctggggc	ctcggtgcac	atgcttaca	tgtgtttagt	cgaggttaaa	1740
aaacgtctag	gccccccggaa	ccacggggac	gtggtttcc	tttggaaaac	acgataatac	1800
c atg gac cgg gag atg gca gca tcg tgc gga ggc gcg gtt ttc gta ggt						1849
Met Asp Arg Glu Met Ala Ala Ser Cys Gly Gly Ala Val Phe Val Gly						
1	5	10	15			

ctg ata ctc ttg acc ttg tca ccg cac tat aag ctg ttc ctc gct agg						1897
Leu Ile Leu Leu Thr Leu Ser Pro His Tyr Lys Leu Phe Leu Ala Arg						
20	25	30				

ctc ata tgg tgg tta caa tat ttt atc acc agg gcc gag gca cac ttg						1945
Leu Ile Trp Trp Leu Gln Tyr Phe Ile Thr Arg Ala Glu Ala His Leu						
35	40	45				

caa gtg tgg atc ccc ccc ctc aac gtt cg ggg ggc cgc gat gcc gtc						1993
Gln Val Trp Ile Pro Pro Leu Asn Val Arg Gly Gly Arg Asp Ala Val						
50	55	60				

atc ctc ctc acg tgc gcg atc cac cca gag cta atc ttt acc atc acc						2041
Ile Leu Leu Thr Cys Ala Ile His Pro Glu Leu Ile Phe Thr Ile Thr						
65	70	75	80			

aaa atc ttg ctc gcc ata ctc ggt cca ctc atg gtg ctc cag gct ggt						2089
Lys Ile Leu Leu Ala Ile Leu Gly Pro Leu Met Val Leu Gln Ala Gly						
85	90	95				

ata acc aaa gtg ccg tac ttc gtg cgc gca cac ggg ctc att cgt gca						2137
Ile Thr Lys Val Pro Tyr Phe Val Arg Ala His Gly Leu Ile Arg Ala						
100	105	110				

tgc atg ctg gtg cgg aag gtt gct ggg ggt cat tat gtc caa atg gct						2185
Cys Met Leu Val Arg Lys Val Ala Gly Gly His Tyr Val Gln Met Ala						
115	120	125				

ctc atg aag ttg gcc gca ctg aca ggt acg tac gtt tat gac cat ctc						2233
---	--	--	--	--	--	------

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Leu	Met	Lys	Leu	Ala	Ala	Leu	Thr	Gly	Thr	Tyr	Val	Tyr	Asp	His	Leu
130						135					140				
acc	cca	ctg	cg	gac	tgg	gcc	cac	gcg	ggc	cta	cga	gac	ctt	gcg	gtg
Thr	Pro	Leu	Arg	Asp	Trp	Ala	His	Ala	Gly	Leu	Arg	Asp	Leu	Ala	Val
145					150					155					160
gca	gtt	gag	ccc	gtc	gtc	ttc	tct	gat	atg	gag	acc	aag	gtt	atc	acc
Ala	Val	Glu	Pro	Val	Val	Phe	Ser	Asp	Met	Glu	Thr	Lys	Val	Ile	Thr
					165				170				175		
tgg	ggg	gca	gac	acc	gcg	gcg	tgt	ggg	gac	atc	atc	ttg	ggc	ctg	ccc
Trp	Gly	Ala	Asp	Thr	Ala	Ala	Cys	Gly	Asp	Ile	Ile	Leu	Gly	Leu	Pro
					180			185					190		
gtc	tcc	gcc	cgc	agg	ggg	agg	gag	ata	cat	ctg	gga	ccg	gca	gac	agc
Val	Ser	Ala	Arg	Arg	Gly	Arg	Glu	Ile	His	Leu	Gly	Pro	Ala	Asp	Ser
					195			200				205			
ctt	gaa	ggg	cag	ggg	tgg	cga	ctc	ctc	gcg	cct	att	acg	gcc	tac	tcc
Leu	Glu	Gly	Gln	Gly	Trp	Arg	Leu	Leu	Ala	Pro	Ile	Thr	Ala	Tyr	Ser
					210		215				220				
caa	cag	acg	cga	ggc	cta	ctt	ggc	tgc	atc	atc	act	agc	ctc	aca	ggc
Gln	Gln	Thr	Arg	Gly	Leu	Leu	Gly	Cys	Ile	Ile	Thr	Ser	Leu	Thr	Gly
					225		230				235				240
cg	gac	agg	aac	cag	gtc	gag	ggg	gag	gtc	caa	gtg	gtc	tcc	acc	gca
Arg	Asp	Arg	Asn	Gln	Val	Glu	Gly	Glu	Val	Gln	Val	Val	Ser	Thr	Ala
					245			250					255		
aca	caa	tct	ttc	ctg	gcg	acc	tgc	gtc	aat	ggc	gtg	tgt	tgg	act	gtc
Thr	Gln	Ser	Phe	Leu	Ala	Thr	Cys	Val	Asn	Gly	Val	Cys	Trp	Thr	Val
					260			265				270			
tat	cat	gg	gcc	ggc	tca	aag	acc	ctt	gcc	ggc	cca	aag	ggc	cca	atc
Tyr	His	Gly	Ala	Gly	Ser	Lys	Thr	Leu	Ala	Gly	Pro	Lys	Gly	Pro	Ile
					275		280				285				
acc	caa	atg	tac	acc	aat	gt	gac	cag	gac	ctc	gtc	ggc	tgg	caa	ggc
Thr	Gln	Met	Tyr	Thr	Asn	Val	Asp	Gln	Asp	Leu	Val	Gly	Trp	Gln	Ala
					290		295				300				
ccc	ccc	ggg	gcg	cgt	tcc	ttg	aca	cca	tgc	acc	tgc	ggc	agc	tcg	gac
Pro	Pro	Gly	Ala	Arg	Ser	Leu	Thr	Pro	Cys	Thr	Cys	Gly	Ser	Ser	Asp
					305		310				315				320
ctt	tac	ttg	gtc	acg	agg	cat	gcc	gat	gtc	att	ccg	gtg	cgc	cgg	cgg
Leu	Tyr	Leu	Val	Thr	Arg	His	Ala	Asp	Val	Ile	Pro	Val	Arg	Arg	Arg
					325			330					335		
ggc	gac	ggc	agg	ggg	agc	cta	ctc	tcc	ccc	agg	ccc	gtc	tcc	tac	ttg
Gly	Asp	Gly	Arg	Gly	Ser	Leu	Leu	Ser	Pro	Arg	Pro	Val	Ser	Tyr	Leu
					340			345				350			
aag	ggc	tct	tcg	ggc	ggt	cca	ctg	ctc	tgc	ccc	tcg	ggg	cac	gct	gtg
Lys	Gly	Ser	Ser	Gly	Gly	Pro	Leu	Leu	Cys	Pro	Ser	Gly	His	Ala	Val
					355		360				365				
ggc	atc	ttt	cg	gct	gcc	gt	tgc	acc	cga	ggg	gtt	gcg	aag	gcg	gtg
Gly	Ile	Phe	Arg	Ala	Ala	Val	Cys	Thr	Arg	Gly	Val	Ala	Lys	Ala	Val
					370		375				380				
gac	ttt	gta	ccc	gtc	gag	tct	atg	gga	acc	act	atg	cgg	tcc	ccg	gtc
Asp	Phe	Val	Pro	Val	Glu	Ser	Met	Gly	Thr	Thr	Met	Arg	Ser	Pro	Val
					385		390				395				400
ttc	acg	gac	aac	tcg	tcc	cct	ccg	gcc	gta	ccg	cag	aca	ttc	cag	gtg

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Phe	Thr	Asp	Asn	Ser	Ser	Pro	Pro	Ala	Val	Pro	Gln	Thr	Phe	Gln	Val	
405									410						415	
gcc	cat	cta	cac	gcc	cct	act	ggt	agc	ggc	aag	agc	act	aag	gtg	ccg	3097
Ala	His	Leu	His	Ala	Pro	Thr	Gly	Ser	Gly	Lys	Ser	Thr	Lys	Val	Pro	
420								425						430		
gct	gcg	tat	gca	gcc	caa	ggg	tat	aag	gtg	ctt	gtc	ctg	aac	ccg	tcc	3145
Ala	Ala	Tyr	Ala	Ala	Gln	Gly	Tyr	Lys	Val	Leu	Val	Leu	Asn	Pro	Ser	
435							440					445				
gtc	gcc	gcc	acc	cta	ggt	ttc	ggg	gcy	tat	atg	tct	aag	gca	cat	ggt	3193
Val	Ala	Ala	Thr	Leu	Gly	Phe	Gly	Ala	Tyr	Met	Ser	Lys	Ala	His	Gly	
450						455				460						
atc	gac	cct	aac	atc	aga	acc	ggg	gta	agg	acc	atc	acc	acg	ggt	gcc	3241
Ile	Asp	Pro	Asn	Ile	Arg	Thr	Gly	Val	Arg	Thr	Ile	Thr	Thr	Gly	Ala	
465						470				475					480	
ccc	atc	acg	tac	tcc	acc	tat	ggc	aag	ttt	ctt	gcc	gac	ggt	ggt	tgc	3289
Pro	Ile	Thr	Tyr	Ser	Thr	Tyr	Gly	Lys	Phe	Leu	Ala	Asp	Gly	Gly	Cys	
485						490						495				
tct	ggg	ggc	gcc	tat	gac	atc	ata	ata	tgt	gat	gag	tgc	cac	tca	act	3337
Ser	Gly	Gly	Ala	Tyr	Asp	Ile	Ile	Ile	Cys	Asp	Glu	Cys	His	Ser	Thr	
500						505						510				
gac	tcg	acc	act	atc	ctg	ggc	atc	ggc	aca	gtc	ctg	gac	caa	ccg	gag	3385
Asp	Ser	Thr	Thr	Ile	Leu	Gly	Ile	Gly	Thr	Val	Leu	Asp	Gln	Ala	Glu	
515						520					525					
acg	gct	gga	gcy	cga	ctc	gtc	gtg	ctc	gcc	acc	gct	acg	cct	ccg	gga	3433
Thr	Ala	Gly	Ala	Arg	Leu	Val	Val	Leu	Ala	Thr	Ala	Thr	Pro	Pro	Gly	
530						535					540					
tcg	gtc	acc	gtg	cca	cat	cca	aac	atc	gag	gag	gtg	gct	ctg	tcc	agc	3481
Ser	Val	Thr	Val	Pro	His	Pro	Asn	Ile	Glu	Glu	Val	Ala	Leu	Ser	Ser	
545						550					555			560		
act	gga	gaa	atc	ccc	ttt	tat	ggc	aaa	gcc	atc	ccc	atc	gag	acc	atc	3529
Thr	Gly	Glu	Ile	Pro	Phe	Tyr	Gly	Lys	Ala	Ile	Pro	Ile	Glu	Thr	Ile	
565						570						575				
aag	ggg	ggg	agg	cac	ctc	att	tcc	tgc	cat	tcc	aag	aag	aaa	tgt	gat	3577
Lys	Gly	Gly	Arg	His	Leu	Ile	Phe	Cys	His	Ser	Lys	Lys	Lys	Cys	Asp	
580						585						590				
gag	ctc	gcc	gcy	aag	ctg	tcc	ggc	ctc	gga	ctc	aat	gct	gta	gca	tat	3625
Glu	Leu	Ala	Ala	Lys	Leu	Ser	Gly	Leu	Gly	Leu	Asn	Ala	Val	Ala	Tyr	
595						600						605				
tac	cg	ggc	ctt	gat	gt	tcc	gtc	ata	cca	act	agc	gga	gac	gtc	att	3673
Tyr	Arg	Gly	Leu	Asp	Val	Ser	Val	Ile	Pro	Thr	Ser	Gly	Asp	Val	Ile	
610						615					620					
gtc	gt	gca	acg	gac	gct	cta	atg	acg	ggc	ttt	acc	ggc	gat	tcc	gac	3721
Val	Val	Ala	Thr	Asp	Ala	Leu	Met	Thr	Gly	Phe	Thr	Gly	Asp	Phe	Asp	
625						630					635			640		
tca	gt	atc	gac	tgc	aat	aca	tgt	gtc	acc	cag	aca	gtc	gac	tcc	agc	3769
Ser	Val	Ile	Asp	Cys	Asn	Thr	Cys	Val	Thr	Gln	Thr	Val	Asp	Phe	Ser	
645						650						655				
ctg	gac	ccg	acc	tcc	acc	att	gag	acg	acg	acc	gtg	cca	caa	gac	gcy	3817
Leu	Asp	Pro	Thr	Phe	Thr	Ile	Glu	Thr	Thr	Thr	Val	Pro	Gln	Asp	Ala	
660						665						670				
gtg	tca	cgc	tcg	cag	cgg	cga	ggc	agg	act	ggt	agg	ggc	agg	atg	ggc	3865

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val	Ser	Arg	Ser	Gln	Arg	Arg	Gly	Arg	Thr	Gly	Arg	Gly	Arg	Met	Gly
675							680					685			
att	tac	agg	ttt	gtg	act	cca	gga	gaa	cgg	ccc	tcg	ggc	atg	ttc	gat
Ile	Tyr	Arg	Phe	Val	Thr	Pro	Gly	Glu	Arg	Pro	Ser	Gly	Met	Phe	Asp
690						695					700				3913
tcc	tcg	gtt	ctg	tgc	gag	tgc	tat	gac	gcg	ggc	tgt	gct	tgg	tac	gag
Ser	Ser	Val	Leu	Cys	Glu	Cys	Tyr	Asp	Ala	Gly	Cys	Ala	Trp	Tyr	Glu
705					710					715				720	3961
ctc	acg	ccc	gcc	gag	acc	tca	gtt	agg	ttg	cgg	gct	tac	cta	aac	aca
Leu	Thr	Pro	Ala	Glu	Thr	Ser	Val	Arg	Leu	Arg	Ala	Tyr	Leu	Asn	Thr
					725				730				735		4009
cca	ggg	ttg	ccc	gtc	tgc	cag	gac	cat	ctg	gag	ttc	tgg	gag	agc	gtc
Pro	Gly	Leu	Pro	Val	Cys	Gln	Asp	His	Leu	Glu	Phe	Trp	Glu	Ser	Val
					740			745					750		4057
ttt	aca	ggc	ctc	acc	cac	ata	gac	gcc	cat	ttc	ttg	tcc	cag	act	aag
Phe	Thr	Gly	Leu	Thr	His	Ile	Asp	Ala	His	Phe	Leu	Ser	Gln	Thr	Lys
					755			760				765			4105
cag	gca	gga	gac	aac	ttc	ccc	tac	ctg	gta	gca	tac	cag	gct	acg	gtc
Gln	Ala	Gly	Asp	Asn	Phe	Pro	Tyr	Leu	Val	Ala	Tyr	Gln	Ala	Thr	Val
					770			775				780			4153
tgc	gcc	agg	gct	cag	gct	cca	cct	cca	tcg	tgg	gac	caa	atg	tgg	aag
Cys	Ala	Arg	Ala	Gln	Ala	Pro	Pro	Pro	Ser	Trp	Asp	Gln	Met	Trp	Lys
					785			790				795			4201
tgt	ctc	ata	cg	cta	aag	cct	acg	ctg	cac	ggg	cca	acg	ccc	ctg	ctg
Cys	Leu	Ile	Arg	Leu	Lys	Pro	Thr	Leu	His	Gly	Pro	Thr	Pro	Leu	Leu
					805				810				815		4249
tat	agg	ctg	gga	gcc	gtt	caa	aac	gag	gtt	act	acc	aca	cac	ccc	ata
Tyr	Arg	Leu	Gly	Ala	Val	Gln	Asn	Glu	Val	Thr	Thr	Thr	His	Pro	Ile
					820			825				830			4297
acc	aaa	tac	atc	atg	gca	tgc	atg	tcg	gct	gac	ctg	gag	gtc	gtc	acg
Thr	Lys	Tyr	Ile	Met	Ala	Cys	Met	Ser	Ala	Asp	Leu	Glu	Val	Val	Thr
					835			840				845			4345
agc	acc	tgg	gtg	ctg	gta	ggc	gga	gtc	cta	gca	gct	ctg	gcc	gcg	tat
Ser	Thr	Trp	Val	Leu	Val	Gly	Gly	Val	Leu	Ala	Ala	Leu	Ala	Ala	Tyr
					850			855				860			4393
tgc	ctg	aca	aca	ggc	agc	gtg	gtc	att	gtg	ggc	agg	atc	atc	ttg	tcc
Cys	Leu	Thr	Thr	Gly	Ser	Val	Val	Ile	Val	Gly	Arg	Ile	Ile	Leu	Ser
					865			870				875			4441
gga	aag	ccg	gcc	atc	att	ccc	gac	agg	gaa	gtc	ttt	tac	cgg	gag	ttc
Gly	Lys	Pro	Ala	Ile	Ile	Pro	Asp	Arg	Glu	Val	Phe	Tyr	Arg	Glu	Phe
					885				890				895		4489
gat	gag	atg	gaa	gag	tgc	gcc	tca	cac	ctc	cct	tac	atc	gaa	cag	gga
Asp	Glu	Met	Glu	Glu	Cys	Ala	Ser	His	Leu	Pro	Tyr	Ile	Glu	Gln	Gly
					900			905					910		4537
atg	cag	ctc	gcc	gaa	caa	ttc	aaa	cag	aag	gca	atc	ggg	ttg	ctg	caa
Met	Gln	Leu	Ala	Glu	Gln	Phe	Lys	Gln	Lys	Ala	Ile	Gly	Leu	Leu	Gln
					915			920				925			4585
aca	gcc	acc	aag	caa	gcg	gag	gct	gct	gct	ccc	gtg	gtg	gaa	tcc	aag
Thr	Ala	Thr	Lys	Gln	Ala	Glu	Ala	Ala	Ala	Pro	Val	Val	Glu	Ser	Lys
					930			935				940			4633
tgg	cgg	acc	ctc	gaa	gcc	ttc	tgg	gcg	aag	cat	atg	tgg	aat	ttc	atc

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Gln	Thr	Thr	Cys	Pro	Cys	Gly	Ala	Gln	Ile	Thr	Gly	His	Val	Lys	Asn		
1220					1225						1230						
cgt	tcc	atg	agg	atc	gtg	ggg	cct	agg	acc	tgt	agt	aac	acg	tgg	cat	5545	
Arg	Ser	Met	Arg	Ile	Val	Gly	Pro	Arg	Thr	Cys	Ser	Asn	Thr	Trp	His		
1235					1240						1245						
gga	aca	ttc	ccc	att	aac	gcg	tac	acc	acg	ggc	ccc	tgc	acg	ccc	tcc	5593	
Gly	Thr	Phe	Pro	Ile	Asn	Ala	Tyr	Thr	Thr	Gly	Pro	Cys	Thr	Pro	Ser		
1250					1255					1260							
ccg	gcg	cca	aat	tat	tct	agg	gcg	ctg	tgg	cgg	gtg	gct	gct	gag	gag	5641	
Pro	Ala	Pro	Asn	Tyr	Ser	Arg	Ala	Leu	Trp	Arg	Val	Ala	Ala	Glu	Glu		
1265					1270					1275					1280		
tac	gtg	gag	gtt	acg	cg	gtg	ggg	gat	ttc	cac	tac	gtg	acg	ggc	atg	5689	
Tyr	Val	Glu	Val	Thr	Arg	Val	Gly	Asp	Phe	His	Tyr	Val	Thr	Gly	Met		
1285					1290					1295							
acc	act	gac	aac	gta	aag	tgc	ccg	tgt	cag	gtt	ccg	gcc	ccc	gaa	ttc	5737	
Thr	Thr	Asp	Asn	Val	Lys	Cys	Pro	Cys	Gln	Val	Pro	Ala	Pro	Glu	Phe		
1300					1305					1310							
ttc	aca	gaa	gtg	gat	ggg	gtg	cg	ttg	cac	agg	tac	gct	cca	gcg	tgc	5785	
Phe	Thr	Glu	Val	Asp	Gly	Val	Arg	Leu	His	Arg	Tyr	Ala	Pro	Ala	Cys		
1315					1320					1325							
aaa	ccc	ctc	cta	cg	gag	gag	gtc	aca	t	tc	ctg	gtc	ggg	ctc	aat	caa	5833
Lys	Pro	Leu	Leu	Arg	Glu	Glu	Val	Thr	Phe	Leu	Val	Gly	Leu	Asn	Gln		
1330					1335					1340							
tac	ctg	gtt	ggg	tca	cag	ctc	cca	tgc	gag	ccc	gaa	ccg	gac	gta	gca	5881	
Tyr	Leu	Val	Gly	Ser	Gln	Leu	Pro	Cys	Glu	Pro	Glu	Pro	Asp	Val	Ala		
1345					1350					1355					1360		
gtg	ctc	act	tcc	atg	ctc	acc	gac	ccc	tcc	cac	att	acg	gct	gag	acg	5929	
Val	Leu	Thr	Ser	Met	Leu	Thr	Asp	Pro	Ser	His	Ile	Thr	Ala	Glu	Thr		
1365					1370					1375							
gct	aag	cgt	agg	ctg	gcc	agg	gga	tct	ccc	ccc	tcc	ttg	gcc	agc	tca	5977	
Ala	Lys	Arg	Arg	Leu	Ala	Arg	Gly	Ser	Pro	Pro	Ser	Leu	Ala	Ser	Ser		
1380					1385					1390							
tca	gct	agc	cag	ctg	tct	g	cct	tcc	ttg	aag	gca	aca	tgc	act	acc	6025	
Ser	Ala	Ser	Gln	Leu	Ser	Ala	Pro	Ser	Leu	Lys	Ala	Thr	Cys	Thr	Thr		
1395					1400					1405							
cgt	cat	gac	tcc	ccg	gac	gct	gac	ctc	atc	gag	gcc	aac	ctc	ctg	tgg	6073	
Arg	His	Asp	Ser	Pro	Asp	Ala	Asp	Leu	Ile	Glu	Ala	Asn	Leu	Leu	Trp		
1410					1415					1420							
cgg	cag	gag	atg	ggc	ggg	aac	atc	acc	cgc	gtg	gag	tca	gaa	aat	aag	6121	
Arg	Gln	Glu	Met	Gly	Gly	Asn	Ile	Thr	Arg	Val	Glu	Ser	Glu	Asn	Lys		
1425					1430					1435					1440		
gta	gta	att	ttg	gac	tct	ttc	gag	ccg	ctc	caa	gct	gag	gag	gat	gag	6169	
Val	Val	Ile	Leu	Asp	Ser	Phe	Glu	Pro	Leu	Gln	Ala	Glu	Glu	Asp	Glu		
1445					1450					1455							
agg	gaa	gta	tcc	gtt	ccg	g	atc	ctg	cg	agg	tcc	agg	aaa	ttc		6217	
Arg	Glu	Val	Ser	Val	Pro	Ala	Glu	Ile	Leu	Arg	Arg	Ser	Arg	Lys	Phe		
1460					1465					1470							
cct	cga	g	atg	ccc	ata	tgg	gca	cgc	ccg	gat	tac	aac	cct	cca	ctg	6265	
Pro	Arg	Ala	Met	Pro	Ile	Trp	Ala	Arg	Pro	Asp	Tyr	Asn	Pro	Pro	Leu		
1475					1480					1485							
tta	gag	tcc	tgg	aag	gac	ccg	gac	tac	gtc	cct	cca	gtg	gta	cac	ggg	6313	

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Leu	Glu	Ser	Trp	Lys	Asp	Pro	Asp	Tyr	Val	Pro	Pro	Val	Val	His	Gly	
1490					1495					1500						
tgt	cca	ctg	ccg	cct	gcc	aag	gcc	cct	ccg	ata	cca	cct	cca	cgg	agg	6361
Cys	Pro	Leu	Pro	Pro	Ala	Lys	Ala	Pro	Pro	Ile	Pro	Pro	Pro	Arg	Arg	
1505						1510				1515						1520
aag	agg	acg	gtt	gtc	ctg	tca	gaa	tct	acc	gtg	tct	tct	gcc	ttg	gcg	6409
Lys	Arg	Thr	Val	Val	Leu	Ser	Glu	Ser	Thr	Val	Ser	Ser	Ala	Leu	Ala	
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gag	ctc	gcc	aca	aag	acc	ttc	ggc	agc	tcc	gaa	tcg	tcg	gcc	gtc	gac	6457
Glu	Leu	Ala	Thr	Lys	Thr	Phe	Gly	Ser	Ser	Glu	Ser	Ser	Ala	Val	Asp	
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agc	ggc	acg	gca	acg	gcc	tct	cct	gac	cag	ccc	tcc	gac	gac	ggc	gac	6505
Ser	Gly	Thr	Ala	Thr	Ala	Ser	Pro	Asp	Gln	Pro	Ser	Asp	Asp	Gly	Asp	
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gcg	gga	tcc	gac	gtt	gag	tcg	tac	tcc	tcc	atg	ccc	ccc	ctt	gag	ggg	6553
Ala	Gly	Ser	Asp	Val	Glu	Ser	Tyr	Ser	Ser	Met	Pro	Pro	Leu	Glu	Gly	
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gag	ccg	ggg	gat	ccc	gat	ctc	agc	gac	ggg	cct	tgg	tct	acc	gta	agc	6601
Glu	Pro	Gly	Asp	Pro	Asp	Leu	Ser	Asp	Gly	Pro	Trp	Ser	Thr	Val	Ser	
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gag	gag	gct	agt	gag	gac	gtc	gtc	tgc	tgc	tcg	atg	tcc	tac	aca	tgg	6649
Glu	Glu	Ala	Ser	Glu	Asp	Val	Val	Cys	Cys	Ser	Met	Ser	Tyr	Thr	Trp	
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aca	ggc	gcc	ctg	atc	acg	cca	tgc	gct	gcg	gag	gaa	acc	aag	ctg	ccc	6697
Thr	Gly	Ala	Leu	Ile	Thr	Pro	Cys	Ala	Ala	Glu	Glu	Thr	Lys	Leu	Pro	
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atc	aat	gca	ctg	agc	aac	tct	ttg	ctc	cgt	cac	cac	aac	ttg	gtc	tat	6745
Ile	Asn	Ala	Leu	Ser	Asn	Ser	Leu	Leu	Arg	His	His	Asn	Leu	Val	Tyr	
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gct	aca	aca	tct	cgc	agc	gca	agc	ctg	cgg	cag	aag	aag	gtc	acc	ttt	6793
Ala	Thr	Thr	Ser	Arg	Ser	Ala	Ser	Leu	Arg	Gln	Lys	Lys	Val	Thr	Phe	
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gac	aga	ctg	cag	gtc	ctg	gac	gac	cac	tac	cgg	gac	gtg	ctc	aag	gag	6841
Asp	Arg	Leu	Gln	Val	Leu	Asp	Asp	His	Tyr	Arg	Asp	Val	Leu	Lys	Glu	
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atg	aag	gcg	aag	gcg	tcc	aca	gtt	aag	gct	aaa	ctt	cta	tcc	gtg	gag	6889
Met	Lys	Ala	Lys	Ala	Ser	Thr	Val	Lys	Ala	Lys	Leu	Leu	Ser	Val	Glu	
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gaa	gcc	tgt	aag	ctg	acg	ccc	cca	cat	tcg	gcc	aga	tct	aaa	ttt	ggc	6937
Glu	Ala	Cys	Lys	Leu	Thr	Pro	Pro	His	Ser	Ala	Arg	Ser	Lys	Phe	Gly	
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tat	ggg	gca	aag	gac	gtc	cgg	aac	cta	tcc	agc	aag	gcc	gtt	aac	cac	6985
Tyr	Gly	Ala	Lys	Asp	Val	Arg	Asn	Leu	Ser	Ser	Lys	Ala	Val	Asn	His	
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atc	cgc	tcc	gtg	tgg	aag	gac	ttg	ctg	gaa	gac	act	gag	aca	cca	att	7033
Ile	Arg	Ser	Val	Trp	Lys	Asp	Leu	Leu	Glu	Asp	Thr	Glu	Thr	Pro	Ile	
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gac	acc	acc	atc	atg	gca	aaa	aat	gag	gtt	ttc	tgc	gtc	caa	cca	gag	7081
Asp	Thr	Thr	Ile	Met	Ala	Lys	Asn	Glu	Val	Phe	Cys	Val	Gln	Pro	Glu	
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aag	ggg	ggc	cgc	aag	cca	gct	cgc	ctt	atc	gta	ttc	cca	gat	ttg	ggg	7129

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Lys	Gly	Gly	Arg	Lys	Pro	Ala	Arg	Leu	Ile	Val	Phe	Pro	Asp	Leu	Gly	
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Val	Arg	Val	Cys	Glu	Lys	Met	Ala	Leu	Tyr	Asp	Val	Val	Ser	Thr	Leu	
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cct	cag	gcc	gtg	atg	gac	tct	tca	tac	gga	ttc	caa	tac	tct	cct	gga	7225
Pro	Gln	Ala	Val	Met	Gly	Ser	Ser	Tyr	Gly	Phe	Gln	Tyr	Ser	Pro	Gly	
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cag	cgg	gtc	gag	ttc	ctg	gtg	aat	gcc	tgg	aaa	gcg	aag	aaa	tgc	cct	7273
Gln	Arg	Val	Glu	Phe	Leu	Val	Asn	Ala	Trp	Lys	Ala	Lys	Lys	Cys	Pro	
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atg	ggc	ttc	gca	tat	gac	acc	cgc	tgt	ttt	gac	tca	acg	gtc	act	gag	7321
Met	Gly	Phe	Ala	Tyr	Asp	Thr	Arg	Cys	Phe	Asp	Ser	Thr	Val	Thr	Glu	
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aat	gac	atc	cgt	gtt	gag	gag	tca	atc	tac	caa	tgt	tgt	gac	ttg	gcc	7369
Asn	Asp	Ile	Arg	Val	Glu	Glu	Ser	Ile	Tyr	Gln	Cys	Cys	Asp	Leu	Ala	
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ccc	gaa	gcc	aga	cag	gcc	ata	agg	tcg	ctc	aca	gag	cgg	ctt	tac	atc	7417
Pro	Glu	Ala	Arg	Gln	Ala	Ile	Arg	Ser	Leu	Thr	Glu	Arg	Leu	Tyr	Ile	
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ggg	ggc	ccc	ctg	act	aat	tct	aaa	ggg	cag	aac	tgc	ggc	tat	cgc	cgg	7465
Gly	Gly	Pro	Leu	Thr	Asn	Ser	Lys	Gly	Gln	Asn	Cys	Gly	Tyr	Arg	Arg	
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tgc	cgc	gag	ggt	gta	ctg	acg	acc	agc	tgc	ggt	aat	acc	ctc	aca		7513
Cys	Arg	Ala	Ser	Gly	Val	Leu	Thr	Thr	Ser	Cys	Gly	Asn	Thr	Leu	Thr	
									1890					1900		
tgt	tac	ttg	aag	gcc	gct	gcg	gcc	tgt	cga	gct	gcg	aag	ctc	cag	gac	7561
Cys	Tyr	Leu	Lys	Ala	Ala	Ala	Ala	Cys	Arg	Ala	Ala	Lys	Leu	Gln	Asp	
									1905					1920		
tgc	acg	atg	ctc	gta	tgc	gga	gac	gac	ctt	gtc	gtt	atc	tgt	gaa	agc	7609
Cys	Thr	Met	Leu	Val	Cys	Gly	Asp	Asp	Leu	Val	Val	Ile	Cys	Glu	Ser	
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gcg	ggg	acc	caa	gag	gac	gag	gcf	agc	cta	cgf	gcc	ttc	acg	gag	gct	7657
Ala	Gly	Thr	Gln	Glu	Asp	Glu	Ala	Ser	Leu	Arg	Ala	Phe	Thr	Glu	Ala	
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Met	Thr	Arg	Tyr	Ser	Ala	Pro	Pro	Gly	Asp	Pro	Pro	Lys	Pro	Glu	Tyr	
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Asp	Leu	Glu	Leu	Ile	Thr	Ser	Cys	Ser	Ser	Asn	Val	Ser	Val	Ala	His	
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gat	gca	tct	ggc	aaa	agg	gtg	tac	tat	ctc	acc	cgt	gac	ccc	acc	acc	7801
Asp	Ala	Ser	Gly	Lys	Arg	Val	Tyr	Tyr	Leu	Thr	Arg	Asp	Pro	Thr	Thr	
									1985					2000		
ccc	ctt	gcf	cgf	gct	gcf	tgg	gag	aca	gct	aga	cac	act	cca	gtc	aat	7849
Pro	Leu	Ala	Arg	Ala	Ala	Trp	Glu	Thr	Ala	Arg	His	Thr	Pro	Val	Asn	
									2005					2015		
tcc	tgg	cta	ggc	aac	atc	atc	atg	tat	gcf	ccc	acc	ttg	tgg	gca	agg	7897
Ser	Trp	Leu	Gly	Asn	Ile	Ile	Met	Tyr	Ala	Pro	Thr	Leu	Trp	Ala	Arg	
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atg	atc	ctg	atg	act	cat	ttc	ttc	atc	ctt	cta	gct	cag	gaa	caa		7945

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Met Ile Leu Met Thr His Phe Phe Ser Ile Leu Leu Ala Gln Glu Gln	
2035 2040 2045	
ctt gaa aaa gcc cta gat tgt cag atc tac ggg gcc tgc tac tcc att	7993
Leu Glu Lys Ala Leu Asp Cys Gln Ile Tyr Gly Ala Cys Tyr Ser Ile	
2050 2055 2060	
gag cca ctt gac cta cct cag atc att caa cga ctc cac ggc ctt agc	8041
Glu Pro Leu Asp Leu Pro Gln Ile Ile Gln Arg Leu His Gly Leu Ser	
2065 2070 2075 2080	
gca ttt tca ctc cat agt tac tct cca ggt gag atc aat agg gtg gct	8089
Ala Phe Ser Leu His Ser Tyr Ser Pro Gly Glu Ile Asn Arg Val Ala	
2085 2090 2095	
tca tgc ctc agg aaa ctt ggg gta ccg ccc ttg cga gtc tgg aga cat	8137
Ser Cys Leu Arg Lys Leu Gly Val Pro Pro Leu Arg Val Trp Arg His	
2100 2105 2110	
cgg gcc aga agt gtc cgc gct agg cta ctg tcc cag ggg ggg agg gct	8185
Arg Ala Arg Ser Val Arg Ala Arg Leu Leu Ser Gln Gly Gly Arg Ala	
2115 2120 2125	
gcc act tgt ggc aag tac ctc ttc aac tgg gca gta agg acc aag ctc	8233
Ala Thr Cys Gly Lys Tyr Leu Phe Asn Trp Ala Val Arg Thr Lys Leu	
2130 2135 2140	
aaa ctc act cca atc ccg gct gcg tcc cag ttg gat tta tcc agc tgg	8281
Lys Leu Thr Pro Ile Pro Ala Ala Ser Gln Leu Asp Leu Ser Ser Trp	
2145 2150 2155 2160	
ttc gtt gct ggt tac agc ggg gga gac ata tat cac agc ctg tct cgt	8329
Phe Val Ala Gly Tyr Ser Gly Gly Asp Ile Tyr His Ser Leu Ser Arg	
2165 2170 2175	
gcc cga ccc cgc tgg ttc atg tgg tgc cta ctc cta ctt tct gta ggg	8377
Ala Arg Pro Arg Trp Phe Met Trp Cys Leu Leu Leu Ser Val Gly	
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Val Gly Ile Tyr Leu Leu Pro Asn Arg *	
2195 2200	
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aagtatccat catggctgtat gcaatgcggc ggctgcatac gcttgcgtatcc gctacccgtcc	780
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gcttgcgaa tatcatgtgtg gaaaatggcc gctttctgg attcatcgac tttggccggc	1020
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c atg gac cgg gag atg gca gca tcg tgc gga ggc gcg gtt ttc gta ggt	1849
Met Asp Arg Glu Met Ala Ala Ser Cys Gly Gly Ala Val Phe Val Gly	
1 5 10 15	
ctg ata ctc ttg acc ttg tca ccg cac tat aag ctg ttc ctc gct agg	1897
Leu Ile Leu Leu Thr Leu Ser Pro His Tyr Lys Leu Phe Leu Ala Arg	
20 25 30	
ctc ata tgg tgg tta caa tat ttt atc acc agg gcc gag gca cac ttg	1945
Leu Ile Trp Trp Leu Gln Tyr Phe Ile Thr Arg Ala Glu Ala His Leu	
35 40 45	
caa gtg tgg atc ccc ccc ctc aac gtt cgg ggg ggc cgc gat gcc gtc	1993
Gln Val Trp Ile Pro Pro Leu Asn Val Arg Gly Gly Arg Asp Ala Val	
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Ile Leu Leu Thr Cys Ala Ile His Pro Glu Leu Ile Phe Thr Ile Thr	
65 70 75 80	
aaa atc ttg ctc gcc ata ctc ggt cca ctc atg gtg ctc cag gct ggt	2089
Lys Ile Leu Leu Ala Ile Leu Gly Pro Leu Met Val Leu Gln Ala Gly	
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ata acc aaa gtg ccg tac ttc gtg cgc gca cac ggg ctc att cgt gca	2137
Ile Thr Lys Val Pro Tyr Phe Val Arg Ala His Gly Leu Ile Arg Ala	
100 105 110	
tgc atg ctg gtg cgg aag gtt gct ggg ggt cat tat gtc caa atg gct	2185
Cys Met Leu Val Arg Lys Val Ala Gly Gly His Tyr Val Gln Met Ala	
115 120 125	
ctc atg aag ttg gcc gca ctg aca ggt acg tac gtt tat gac cat ctc	2233
Leu Met Lys Leu Ala Ala Leu Thr Gly Thr Tyr Val Tyr Asp His Leu	
130 135 140	
acc cca ctg cgg gac tgg gcc cac gcg ggc cta cga gac ctt gcg gtg	2281
Thr Pro Leu Arg Asp Trp Ala His Ala Gly Leu Arg Asp Leu Ala Val	
145 150 155 160	
gca gtt gag ccc gtc gtc ttc tct gat atg gag acc aag gtt atc acc	2329
Ala Val Glu Pro Val Val Phe Ser Asp Met Glu Thr Lys Val Ile Thr	
165 170 175	
tgg ggg gca gac acc gcg gcg tgt ggg gac atc atc ttg ggc ctg ccc	2377
Trp Gly Ala Asp Thr Ala Ala Cys Gly Asp Ile Ile Leu Gly Leu Pro	
180 185 190	

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ccc atc acg tac tcc acc tat ggc aag ttt ctt gcc gac ggt ggt tgc Pro Ile Thr Tyr Ser Thr Tyr Gly Lys Phe Leu Ala Asp Gly Gly Cys 485 490 495	3289
tct ggg ggc gcc tat gac atc ata ata tgt gat gag tgc cac tca act Ser Gly Gly Ala Tyr Asp Ile Ile Cys Asp Glu Cys His Ser Thr 500 505 510	3337
gac tcg acc act atc ctg ggc atc ggc aca gtc ctg gac caa gcg gag Asp Ser Thr Thr Ile Leu Gly Ile Gly Thr Val Leu Asp Gln Ala Glu 515 520 525	3385
acg gct gga gcg cga ctc gtc gtg ctc gcc acc gct acg cct ccg gga Thr Ala Gly Ala Arg Leu Val Val Leu Ala Thr Ala Thr Pro Pro Gly 530 535 540	3433
tcg gtc acc gtg cca cat cca aac atc gag gag gtg gct ctg tcc agc Ser Val Thr Val Pro His Pro Asn Ile Glu Glu Val Ala Leu Ser Ser 545 550 555 560	3481
act gga gaa atc ccc ttt tat ggc aaa gcc atc ccc atc gag acc atc Thr Gly Glu Ile Pro Phe Tyr Gly Lys Ala Ile Pro Ile Glu Thr Ile 565 570 575	3529
aag ggg ggg agg cac ctc att ttc tgc cat tcc aag aag aaa tgc gat Lys Gly Gly Arg His Leu Ile Phe Cys His Ser Lys Lys Lys Cys Asp 580 585 590	3577
gag ctc gcc gcg aag ctg tcc ggc ctc gga ctc aat gct gta gca tat Glu Leu Ala Ala Lys Leu Ser Gly Leu Gly Leu Asn Ala Val Ala Tyr 595 600 605	3625
tac cgg ggc ctt gat gta tcc gtc ata cca act agc gga gac gtc att Tyr Arg Gly Leu Asp Val Ser Val Ile Pro Thr Ser Gly Asp Val Ile 610 615 620	3673
gtc gta gca acg gac gct cta atg acg ggc ttt acc ggc gat ttc gac Val Val Ala Thr Asp Ala Leu Met Thr Gly Phe Thr Gly Asp Phe Asp 625 630 635 640	3721
tca gtg atc gac tgc aat aca tgt gtc acc cag aca gtc gac ttc agc Ser Val Ile Asp Cys Asn Thr Cys Val Thr Gln Thr Val Asp Phe Ser 645 650 655	3769
ctg gac ccg acc ttc acc att gag acg acg acc gtg cca caa gac gcg Leu Asp Pro Thr Phe Thr Ile Glu Thr Thr Val Pro Gln Asp Ala 660 665 670	3817
gtg tca cgc tcg cag cgg cga ggc agg act ggt agg ggc agg atg ggc Val Ser Arg Ser Gln Arg Arg Gly Arg Thr Gly Arg Gly Arg Met Gly 675 680 685	3865
att tac agg ttt gtg act cca gga gaa cgg ccc tcg ggc atg ttc gat Ile Tyr Arg Phe Val Thr Pro Gly Glu Arg Pro Ser Gly Met Phe Asp 690 695 700	3913
tcc tcg gtt ctg tgc gag tgc tat gac gcg ggc tgt gct tgg tac gag Ser Ser Val Leu Cys Glu Cys Tyr Asp Ala Gly Cys Ala Trp Tyr Glu 705 710 715 720	3961
ctc acg ccc gcc gag acc tca gtt agg ttg cgg gct tac cta aac aca Leu Thr Pro Ala Glu Thr Ser Val Arg Leu Arg Ala Tyr Leu Asn Thr 725 730 735	4009

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cca ggg ttg ccc gtc tgc cag gac cat ctg gag ttc tgg gag ggc gtc Pro Gly Leu Pro Val Cys Gln Asp His Leu Glu Phe Trp Glu Gly Val 740 745 750	4057
ttt aca ggc ctc acc cac ata gac gcc cat ttc ttg tcc cag act aag Phe Thr Gly Leu Thr His Ile Asp Ala His Phe Leu Ser Gln Thr Lys 755 760 765	4105
cag gca gga gac aac ttc ccc tac ctg gta gca tac cag gct acg gtg Gln Ala Gly Asp Asn Phe Pro Tyr Leu Val Ala Tyr Gln Ala Thr Val 770 775 780	4153
tgc gcc agg gct cag gct cca cct cca tcg tgg gac caa atg tgg aag Cys Ala Arg Ala Gln Ala Pro Pro Ser Trp Asp Gln Met Trp Lys 785 790 795 800	4201
tgt ctc ata cgg cta aag cct acg ctg cac ggg cca acg ccc ctg ctg Cys Leu Ile Arg Leu Lys Pro Thr Leu His Gly Pro Thr Pro Leu Leu 805 810 815	4249
tat agg ctg gga gcc gtt caa aac gag gtt act acc aca cac ccc ata Tyr Arg Leu Gly Ala Val Gln Asn Glu Val Thr Thr Thr His Pro Ile 820 825 830	4297
acc aaa tac atc atg gca tgc atg tcg gct gac ctg gag gtc gtc acg Thr Lys Tyr Ile Met Ala Cys Met Ser Ala Asp Leu Glu Val Val Thr 835 840 845	4345
agc acc tgg gtg ctg gta ggc gtc cta gca gct ctg gct gcg tat Ser Thr Trp Val Leu Val Gly Gly Val Leu Ala Ala Leu Ala Ala Tyr 850 855 860	4393
tgc ctg aca aca ggc agc gtg gtc att gtg ggc agg atc atc ttg tcc Cys Leu Thr Thr Gly Ser Val Val Ile Val Gly Arg Ile Ile Leu Ser 865 870 875 880	4441
gga agg ccg gcc atc att ccc gac agg gaa gtc ctt tac cgg gag ttc Gly Arg Pro Ala Ile Ile Pro Asp Arg Glu Val Leu Tyr Arg Glu Phe 885 890 895	4489
gat gag atg gaa gag tgt gcc tca cac ctc cct tac atc gaa cag gga Asp Glu Met Glu Glu Cys Ala Ser His Leu Pro Tyr Ile Glu Gln Gly 900 905 910	4537
atg cag ctc gcc gaa caa ttc aaa cag aag gca atc ggg ttg ctg caa Met Gln Leu Ala Glu Gln Phe Lys Gln Lys Ala Ile Gly Leu Leu Gln 915 920 925	4585
aca gcc acc aag caa gcg gag gct gct gct ccc gtg gtg gaa tcc aag Thr Ala Thr Lys Gln Ala Glu Ala Ala Ala Pro Val Val Glu Ser Lys 930 935 940	4633
tgg cgg acc ctc gaa gcc ttc tgg gcg aag cat atg tgg aat ttc atc Trp Arg Thr Leu Glu Ala Phe Trp Ala Lys His Met Trp Asn Phe Ile 945 950 955 960	4681
agc ggg ata caa tat tta gca ggc ttg tcc act ctg cct ggc aac ccc Ser Gly Ile Gln Tyr Leu Ala Gly Leu Ser Thr Leu Pro Gly Asn Pro 965 970 975	4729
gcg ata gca tca ctg atg gca ttc aca gcc tct atc acc agc ccg ctc Ala Ile Ala Ser Leu Met Ala Phe Thr Ala Ser Ile Thr Ser Pro Leu 980 985 990	4777
acc acc caa cat acc ctc ctg ttt aac atc ctg ggg gga tgg gtg gcc Thr Thr Gln His Thr Leu Leu Phe Asn Ile Leu Gly Gly Trp Val Ala 995 1000 1005	4825

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gcc caa ctt gct cct ccc agc gct gct tcc gct gta ggc gcc ggc Ala Gln Leu Ala Pro Pro Ser Ala Ala Ser Ala Phe Val Gly Ala Gly 1010 1015 1020	4873
atc gct gga gcg gct gtt ggc agc ata ggc ctt ggg aag gtg ctt gtg Ile Ala Gly Ala Ala Val Gly Ser Ile Gly Leu Gly Lys Val Leu Val 1025 1030 1035 1040	4921
gat att ttg gca ggt tat gga gca ggg gtg gca ggc gcg ctc gtg gcc Asp Ile Leu Ala Gly Tyr Gly Ala Gly Val Ala Gly Ala Leu Val Ala 1045 1050 1055	4969
ttt aag gtc atg agc ggc gag atg ccc tcc acc gag gac ctg gtt aac Phe Lys Val Met Ser Gly Glu Met Pro Ser Thr Glu Asp Leu Val Asn 1060 1065 1070	5017
cta ctc cct gct atc ctc tcc cct ggc gcc cta gtc gtc ggg gtc gtg Leu Leu Pro Ala Ile Leu Ser Pro Gly Ala Leu Val Val Gly Val Val 1075 1080 1085	5065
tgc gca gcg ata ctg cgt cggt cac gtg ggc cca ggg gag ggg gct gtg Cys Ala Ala Ile Leu Arg Arg His Val Gly Pro Gly Glu Gly Ala Val 1090 1095 1100	5113
cag tgg atg aac cgg ctg ata gcg ttc gct tcg cgg ggt aac cac gtc Gln Trp Met Asn Arg Leu Ile Ala Phe Ala Ser Arg Gly Asn His Val 1105 1110 1115 1120	5161
tcc ccc acg cac tat gtg cct gag agc gac gct gca gca cgt gtc act Ser Pro Thr His Tyr Val Pro Glu Ser Asp Ala Ala Ala Arg Val Thr 1125 1130 1135	5209
cag atc ctc tct agt ctt acc atc act cag ctg ctg aag agg ctt cac Gln Ile Leu Ser Ser Leu Thr Ile Thr Gln Leu Leu Lys Arg Leu His 1140 1145 1150	5257
cag tgg atc aac gag gac tgc tcc acg cca tgc tcc ggc tcg tgg cta Gln Trp Ile Asn Glu Asp Cys Ser Thr Pro Cys Ser Gly Ser Trp Leu 1155 1160 1165	5305
aga gat gtt tgg gat tgg ata tgc acg gtg ttg act gat ttc aag gcc Arg Asp Val Trp Asp Trp Ile Cys Thr Val Leu Thr Asp Phe Lys Ala 1170 1175 1180	5353
tgg ctc cag tcc aag ctc ctg ccg cga ttg ccg gga gtc ccc ttc ttc Trp Leu Gln Ser Lys Leu Leu Pro Arg Leu Pro Gly Val Pro Phe Phe 1185 1190 1195 1200	5401
tca tgt caa cgt ggg tac aag gga gtc tgg cgg ggc gac ggc atc atg Ser Cys Gln Arg Gly Tyr Lys Gly Val Trp Arg Gly Asp Gly Ile Met 1205 1210 1215	5449
caa acc acc tgc cca tgt gga gca cag atc acc gga cat gtg aaa aac Gln Thr Thr Cys Pro Cys Gly Ala Gln Ile Thr Gly His Val Lys Asn 1220 1225 1230	5497
tgt tcc atg agg atc gtg ggg cct agg acc tgt agt aac acg tgg cat Cys Ser Met Arg Ile Val Gly Pro Arg Thr Cys Ser Asn Thr Trp His 1235 1240 1245	5545
gga aca ttc ccc att aac gcg tac acc acg ggc ccc tgc acg ccc tcc Gly Thr Phe Pro Ile Asn Ala Tyr Thr Thr Gly Pro Cys Thr Pro Ser 1250 1255 1260	5593
ccg gcg cca aat tat tct agg gcg ctg tgg cgg gtg gct gct gag gag Pro Ala Pro Asn Tyr Ser Arg Ala Leu Trp Arg Val Ala Ala Glu Glu 1265 1270 1275 1280	5641

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tac	gtg	gag	gtt	acg	cga	gtg	ggg	gat	ttc	cac	tac	gtg	acg	gac	atg		5689	
Tyr	Val	Glu	Val	Thr	Arg	Val	Gly	Asp	Phe	His	Tyr	Val	Thr	Gly	Met			
1285									1290					1295				
acc	act	gac	aac	gta	aag	tgc	ccg	tgt	cag	gtt	ccg	gcc	ccc	gaa	ttc		5737	
Thr	Thr	Asp	Asn	Val	Lys	Cys	Pro	Cys	Gln	Val	Pro	Ala	Pro	Glu	Phe			
1300					1305								1310					
ttc	aca	gaa	gtg	gat	ggg	gtg	cg	ttg	cac	agg	tac	gct	cca	g	tc		5785	
Phe	Thr	Glu	Val	Asp	Gly	Val	Arg	Leu	His	Arg	Tyr	Ala	Pro	Ala	Cys			
1315					1320								1325					
aaa	ccc	ctc	cta	cg	gag	gtc	aca	ttc	ctg	gtc	ggg	ctc	aat	caa			5833	
Lys	Pro	Leu	Leu	Arg	Glu	Glu	Val	Thr	Phe	Leu	Val	Gly	Leu	Asn	Gln			
1330					1335						1340							
tac	ccg	gtt	ggg	tca	cag	ctc	cca	tgc	gag	ccc	gaa	ctg	gac	gta	gca		5881	
Tyr	Pro	Val	Gly	Ser	Gln	Leu	Pro	Cys	Glu	Pro	Glu	Leu	Asp	Val	Ala			
1345					1350					1355					1360			
gtg	ctc	act	tcc	atg	ctc	acc	gac	ccc	tcc	cac	att	acg	g	cg	gag	acg		5929
Val	Leu	Thr	Ser	Met	Leu	Thr	Asp	Pro	Ser	His	Ile	Thr	Ala	Glu	Thr			
									1370					1375				
gct	aag	cgt	agg	ctg	gcc	agg	gga	tct	ccc	ccc	tcc	ttg	gcc	agc	tca		5977	
Ala	Lys	Arg	Arg	Leu	Ala	Arg	Gly	Ser	Pro	Pro	Ser	Leu	Ala	Ser	Ser			
					1380					1385					1390			
tca	gct	agc	cag	ctg	tct	g	c	c	tcc	ttg	aag	gca	aca	tgc	act	acc		6025
Ser	Ala	Ser	Gln	Leu	Ser	Ala	Pro	Ser	Leu	Lys	Ala	Thr	Cys	Thr	Thr			
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cgt	cat	gac	tcc	ccg	gac	gct	gac	ctc	atc	gag	gcc	aac	ctc	ctg	tgg		6073	
Arg	His	Asp	Ser	Pro	Asp	Ala	Asp	Leu	Ile	Glu	Ala	Asn	Leu	Leu	Trp			
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cg	cag	gag	atg	ggc	ggg	aac	atc	acc	cgc	gtg	gag	tca	gag	aat	aag		6121	
Arg	Gln	Glu	Met	Gly	Gly	Asn	Ile	Thr	Arg	Val	Glu	Ser	Glu	Asn	Lys			
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1440															1440			
gta	gta	att	ttg	gac	tct	ttc	gag	ccg	ctc	caa	g	cg	gag	gag	gat	gag		6169
Val	Val	Ile	Leu	Asp	Ser	Phe	Glu	Pro	Leu	Gln	Ala	Glu	Glu	Asp	Glu			
					1445					1450					1455			
agg	gaa	gta	tcc	gtt	ccg	g	cg	gag	atc	ctg	cg	agg	tcc	agg	aaa	ttc		6217
Arg	Glu	Val	Ser	Val	Pro	Ala	Glu	Ile	Leu	Arg	Arg	Ser	Arg	Arg	Lys	Phe		
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cct	cga	g	atg	ccc	ata	tgg	gca	cgc	ccg	gat	tac	aac	cct	cca	ctg		6265	
Pro	Arg	Ala	Met	Pro	Ile	Trp	Ala	Arg	Pro	Asp	Tyr	Asn	Pro	Pro	Leu			
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tta	gag	tcc	tgg	aag	gac	ccg	gac	tac	gtc	cct	cca	gtg	gta	cac	gg		6313	
Leu	Glu	Ser	Trp	Lys	Asp	Pro	Asp	Tyr	Val	Pro	Pro	Val	Val	His	Gly			
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tgt	cca	ttg	ccg	cct	gcc	aag	gcc	cct	ccg	ata	cca	cct	cca	cg	agg		6361	
Cys	Pro	Leu	Pro	Pro	Ala	Lys	Ala	Pro	Pro	Ile	Pro	Pro	Pro	Arg	Arg			
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1520																		
aag	agg	acg	gtt	gtc	ctg	tca	gaa	tct	acc	gtg	tct	tct	gcc	ttg	g	cg		6409
Lys	Arg	Thr	Val	Val	Leu	Ser	Glu	Ser	Thr	Val	Ser	Ser	Ala	Leu	Ala			
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gag	ctc	gcc	aca	aag	acc	ttc	ggc	agc	tcc	gaa	tcg	tcg	gcc	gtc	gac		6457	
Glu	Leu	Ala	Thr	Lys	Thr	Phe	Gly	Ser	Ser	Glu	Ser	Ser	Ala	Val	Asp			
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agc ggc acg gca acg gcc tct cct gac cag ccc tcc gac gac ggc gac Ser Gly Thr Ala Thr Ala Ser Pro Asp Gln Pro Ser Asp Asp Gly Asp	6505
1555 1560 1565	
gcg gga tcc gac gtt gag tcg tac tcc tcc atg ccc ccc ctt gag ggg Ala Gly Ser Asp Val Glu Ser Tyr Ser Ser Met Pro Pro Leu Glu Gly	6553
1570 1575 1580	
gag ccg ggg gat ccc gat ctc agc gac ggg tct tgg tct acc gta agc Glu Pro Gly Asp Pro Asp Leu Ser Asp Gly Ser Trp Ser Thr Val Ser	6601
1585 1590 1595 1600	
gag gag gct agt gag gac gtc gtc tgc tgc tcg atg tcc tac aca tgg Glu Glu Ala Ser Glu Asp Val Val Cys Cys Ser Met Ser Tyr Thr Trp	6649
1605 1610 1615	
aca ggc gcc ctg atc acg cca tgc gct gcg gag gaa acc aag ctg ccc Thr Gly Ala Leu Ile Thr Pro Cys Ala Ala Glu Glu Thr Lys Leu Pro	6697
1620 1625 1630	
atc aat gca ctg agc aac tct ttg ctc cgt cac cac aac ttg gtc tat Ile Asn Ala Leu Ser Asn Ser Leu Leu Arg His His Asn Leu Val Tyr	6745
1635 1640 1645	
gct aca aca tct cgc agc gca agc ctg cgg cag aag aag gtc acc ttt Ala Thr Thr Ser Arg Ser Ala Ser Leu Arg Gln Lys Lys Val Thr Phe	6793
1650 1655 1660	
gac aga ctg cag gtc ctg gac gac cac tac cgg gac gtg ctc aag gag Asp Arg Leu Gln Val Leu Asp Asp His Tyr Arg Asp Val Leu Lys Glu	6841
1665 1670 1675 1680	
atg aag gcg aag gcg tcc aca gtt aag gct aaa ctt cta tcc gtg gag Met Lys Ala Lys Ala Ser Thr Val Lys Ala Lys Leu Leu Ser Val Glu	6889
1685 1690 1695	
gaa gcc tgt aag ctg acg ccc cca cat tcg gcc aga tct aaa ttt ggc Glu Ala Cys Lys Leu Thr Pro Pro His Ser Ala Arg Ser Lys Phe Gly	6937
1700 1705 1710	
tat ggg gca aag gac gtc cgg aac cta tcc agc aag gcc gtt aac cac Tyr Gly Ala Lys Asp Val Arg Asn Leu Ser Ser Lys Ala Val Asn His	6985
1715 1720 1725	
atc cgc tcc gtg tgg aag gac ttg ctc gaa gac act gag aca cca att Ile Arg Ser Val Trp Lys Asp Leu Leu Glu Asp Thr Glu Thr Pro Ile	7033
1730 1735 1740	
gac acc acc atc atg gca aaa aat gag gtt ttc tgc gtc caa cca gag Asp Thr Thr Ile Met Ala Lys Asn Glu Val Phe Cys Val Gln Pro Glu	7081
1745 1750 1755 1760	
aag ggg ggc cgc aag cca gct cgc ctt atc gta ttc cca gat ttg ggg Lys Gly Arg Lys Pro Ala Arg Leu Ile Val Phe Pro Asp Leu Gly	7129
1765 1770 1775	
gtt cgt gtg tgc gag aaa atg gcc ctt tac gat gtg gtc tcc acc ctc Val Arg Val Cys Glu Lys Met Ala Leu Tyr Asp Val Val Ser Thr Leu	7177
1780 1785 1790	
cct cag gcc gtg atg ggc tct tca tac gga ttc caa tac tct cct gga Pro Gln Ala Val Met Gly Ser Ser Tyr Gly Phe Gln Tyr Ser Pro Gly	7225
1795 1800 1805	
cag cgg gtc gag ttc ctg gtg aat gcc tgg aaa gcg aag aaa tgc cct Gln Arg Val Glu Phe Leu Val Asn Ala Trp Lys Ala Lys Lys Cys Pro	7273
1810 1815 1820	

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atg ggc ttc gca tat gac acc cgc tgt ttt gac tca acg gtc act gag Met Gly Phe Ala Tyr Asp Thr Arg Cys Phe Asp Ser Thr Val Thr Glu 1825 1830 1835 1840	7321
aat gac atc cgt gtt gag gag tca atc tac caa tgt ttt gac ttg gcc Asn Asp Ile Arg Val Glu Glu Ser Ile Tyr Gln Cys Cys Asp Leu Ala 1845 1850 1855	7369
ccc gaa gcc aga cag gcc ata agg tcg ctc aca gag cgg ctt tac atc Pro Glu Ala Arg Gln Ala Ile Arg Ser Leu Thr Glu Arg Leu Tyr Ile 1860 1865 1870	7417
ggg ggc ccc ctg act aat tct aaa ggg cag aac tgc ggc tat cgc cgg Gly Gly Pro Leu Thr Asn Ser Lys Gly Gln Asn Cys Gly Tyr Arg Arg 1875 1880 1885	7465
tgc cgc gcg agc ggt gta ctg acg acc agc tgc ggt aat acc ctc aca Cys Arg Ala Ser Gly Val Leu Thr Ser Cys Gly Asn Thr Leu Thr 1890 1895 1900	7513
tgt tac ttg aag gcc gct gcg gcc ttt cga gct gcg aag ctc cag gac Cys Tyr Leu Lys Ala Ala Ala Cys Arg Ala Ala Lys Leu Gln Asp 1905 1910 1915 1920	7561
tgc acg atg ctc gta tgc gga gac gac ctt gtc gtt atc tgt gaa agc Cys Thr Met Leu Val Cys Gly Asp Asp Leu Val Val Ile Cys Glu Ser 1925 1930 1935	7609
gcg ggg acc caa gag gac gag gcg agc cta cgg gcc ttc acg gag gct Ala Gly Thr Gln Glu Asp Glu Ala Ser Leu Arg Ala Phe Thr Glu Ala 1940 1945 1950	7657
atg act aga tac tct gcc ccc cct ggg gac ccg ccc aaa cca gaa tac Met Thr Arg Tyr Ser Ala Pro Pro Gly Asp Pro Pro Lys Pro Glu Tyr 1955 1960 1965	7705
gac ttg gag ttg ata aca tca tgc tcc tcc aat gtg tca gtc gcg cac Asp Leu Glu Leu Ile Thr Ser Cys Ser Ser Asn Val Ser Val Ala His 1970 1975 1980	7753
gat gca tct ggc aaa agg gtg tac tat ctc acc cgt gac ccc acc acc Asp Ala Ser Gly Lys Arg Val Tyr Tyr Leu Thr Arg Asp Pro Thr Thr 1985 1990 1995 2000	7801
ccc ctt gcg cggt gct gcg tgg gag aca gct aga cac act cca gtc aat Pro Leu Ala Arg Ala Ala Trp Glu Thr Ala Arg His Thr Pro Val Asn 2005 2010 2015	7849
tcc tgg cta ggc aac atc atc atg tat gcg ccc acc ttg tgg gca agg Ser Trp Leu Gly Asn Ile Ile Met Tyr Ala Pro Thr Leu Trp Ala Arg 2020 2025 2030	7897
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ctt gaa aaa gcc cta gat tgt cag atc tac ggg gcc ttt tac tcc att Leu Glu Lys Ala Leu Asp Cys Gln Ile Tyr Gly Ala Cys Tyr Ser Ile 2050 2055 2060	7993
gag cca ctt gac cta cct cag atc att caa cga ctc cac ggc ctt agc Glu Pro Leu Asp Leu Pro Gln Ile Ile Gln Arg Leu His Gly Leu Ser 2065 2070 2075 2080	8041
gca ttt tca ctc cat agt tac tct cca ggt gag atc aat agg gtg gct Ala Phe Ser Leu His Ser Tyr Ser Pro Gly Glu Ile Asn Arg Val Ala 2085 2090 2095	8089

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tca tgc ctc agg aaa ctt ggg gta ccg ccc ttg cga gtc tgg aga cat	8137
Ser Cys Leu Arg Lys Leu Gly Val Pro Pro Leu Arg Val Trp Arg His	
2100 2105 2110	
 cgg gcc aga agt gtc cgc gct agg cta ctg tcc cag ggg ggg agg gct	8185
Arg Ala Arg Ser Val Arg Ala Arg Leu Leu Ser Gln Gly Gly Arg Ala	
2115 2120 2125	
 gcc act tgt ggc aag tac ctc ttc aac tgg gca gta agg acc aag ctc	8233
Ala Thr Cys Gly Lys Tyr Leu Phe Asn Trp Ala Val Arg Thr Lys Leu	
2130 2135 2140	
 aaa ctc act cca atc ccg gct gcg tcc cag ttg gat tta tcc agc tgg	8281
Lys Leu Thr Pro Ile Pro Ala Ala Ser Gln Leu Asp Leu Ser Ser Trp	
2145 2150 2155 2160	
 ttc gtt gct ggt tac agc ggg gga gac ata tat cac agc ctg tct cgt	8329
Phe Val Ala Gly Tyr Ser Gly Gly Asp Ile Tyr His Ser Leu Ser Arg	
2165 2170 2175	
 gcc cga ccc cgc tgg ttc atg tgg tgc cta ctc cta ctt tct gta ggg	8377
Ala Arg Pro Arg Trp Phe Met Trp Cys Leu Leu Leu Ser Val Gly	
2180 2185 2190	
 gta ggc atc tat cta ctc ccc aac cga tga acggggagct aaacactcca	8427
Val Gly Ile Tyr Leu Leu Pro Asn Arg *	
2195 2200	
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gac 63	
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<212> DNA
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<400> 13
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<400> 14
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<400> 15
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<400> 16
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<213> HCV

<400> 17
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<210> 18
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<400> 18
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<220>
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<223> Label with TAMRA: Quencher dye

<400> 19
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<210> 20

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<211> 45
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<400> 23
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<210> 24
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<220>
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 ctcaaaagaaa aacccaaaggg cgccatcgta ttgaacaaga tgattgcac gcagggttctc 420
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 ctgatgccgc cgtgttcccg ctgtcagcgc aggggcgcggc gtttctttt gtcaagaccg 540
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 aagtatccat catggctgat gcaatgcggc ggctgcatac gcttgcattt gctacccgtc 780
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 gaaccccccga cctggcgaca ggtgcctcg cggccaaaag ccacgtgtat aagatcac 1560
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aaacgtctag gccccccgaa ccacggggac gtggtttcc ttgaaaaac acgataatac	1800
c atg gac cgg gag atg gca gca tcg tgc gga ggc gcg gtt ttc gta ggt	1849
Met Asp Arg Glu Met Ala Ala Ser Cys Gly Gly Ala Val Phe Val Gly	
1 5 10 15	
ctg ata ctc ttg acc ttg tca ccg cac tat aag ctg ttc ctc gct agg	1897
Leu Ile Leu Leu Thr Leu Ser Pro His Tyr Lys Leu Phe Leu Ala Arg	
20 25 30	
ctc ata tgg tgg tta caa tat ttt atc acc agg gcc gag gca cac ttg	1945
Leu Ile Trp Trp Leu Gln Tyr Phe Ile Thr Arg Ala Glu Ala His Leu	
35 40 45	
caa gtg tgg atc ccc ccc ctc aac gtt cgg ggg ggc cgc gat gcc gtc	1993
Gln Val Trp Ile Pro Pro Leu Asn Val Arg Gly Gly Arg Asp Ala Val	
50 55 60	
atc ctc ctc acg tgc gcg atc cac cca gag cta atc ttt acc atc acc	2041
Ile Leu Leu Thr Cys Ala Ile His Pro Glu Leu Ile Phe Thr Ile Thr	
65 70 75 80	
aaa atc ttg ctc gcc ata ctc ggt cca ctc atg gtg ctc cag gct ggt	2089
Lys Ile Leu Leu Ala Ile Leu Gly Pro Leu Met Val Leu Gln Ala Gly	
85 90 95	
ata acc aaa gtg ccg tac ttc gtg cgc gca cac ggg ctc att cgt gca	2137
Ile Thr Lys Val Pro Tyr Phe Val Arg Ala His Gly Leu Ile Arg Ala	
100 105 110	
tgc atg ctg gtg cgg aag gtt gct ggg ggt cat tat gtc caa atg gct	2185
Cys Met Leu Val Arg Lys Val Ala Gly Gly His Tyr Val Gln Met Ala	
115 120 125	
ctc atg aag ttg gcc gca ctg aca ggt acg tac gtt tat gac cat ctc	2233
Leu Met Lys Leu Ala Ala Leu Thr Gly Thr Tyr Val Tyr Asp His Leu	
130 135 140	
acc cca ctg cgg gac tgg gcc cac gcg ggc cta cga gac ctt gcg gtg	2281
Thr Pro Leu Arg Asp Trp Ala His Ala Gly Leu Arg Asp Leu Ala Val	
145 150 155 160	
gca gtt gag ccc gtc gtc ttc tct gat atg gag acc aag gtt atc acc	2329
Ala Val Glu Pro Val Val Phe Ser Asp Met Glu Thr Lys Val Ile Thr	
165 170 175	
tgg ggg gca gac acc gcg gcg tgt ggg gac atc atc ttg ggc ctg ccc	2377
Trp Gly Ala Asp Thr Ala Ala Cys Gly Asp Ile Ile Leu Gly Leu Pro	
180 185 190	
gtc tcc gcc cgc agg ggg agg gag ata cat ctg gga ccg gca gac agc	2425
Val Ser Ala Arg Arg Gly Arg Glu Ile His Leu Gly Pro Ala Asp Ser	
195 200 205	
ctt gaa ggg cag ggg tgg cga ctc ctc gcg cct att acg gcc tac tcc	2473
Leu Glu Gln Gly Trp Arg Leu Leu Ala Pro Ile Thr Ala Tyr Ser	
210 215 220	
caa cag acg cga ggc cta ctt ggc tgc atc atc act agc ctc aca ggc	2521
Gln Gln Thr Arg Gly Leu Leu Gly Cys Ile Ile Thr Ser Leu Thr Gly	
225 230 235 240	
cgg gac agg aac cag gtc gag ggg gag gtc caa gtg gtc tcc acc gca	2569
Arg Asp Arg Asn Gln Val Glu Gly Glu Val Gln Val Val Ser Thr Ala	
245 250 255	
aca caa tct ttc ctg gcg acc tgc gtc aat ggc gtg tgt tgg act gtc	2617

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Thr	Gln	Ser	Phe	Leu	Ala	Thr	Cys	Val	Asn	Gly	Val	Cys	Trp	Thr	Val	
260							265						270			
tat	cat	ggt	gcc	ggc	tca	aag	acc	ctt	gcc	ggc	cca	aag	ggc	cca	atc	2665
Tyr	His	Gly	Ala	Gly	Ser	Lys	Thr	Leu	Ala	Gly	Pro	Lys	Gly	Pro	Ile	
275							280						285			
acc	caa	atg	tac	acc	aat	gtg	gac	cag	gac	ctc	gtc	ggc	tgg	caa	gcg	2713
Thr	Gln	Met	Tyr	Thr	Asn	Val	Asp	Gln	Asp	Leu	Val	Gly	Trp	Gln	Ala	
290						295					300					
ccc	ccc	ggg	gcg	cgt	tcc	ttg	aca	cca	tgc	acc	tgc	ggc	agc	tcg	gac	2761
Pro	Pro	Gly	Ala	Arg	Ser	Leu	Thr	Pro	Cys	Thr	Cys	Gly	Ser	Ser	Asp	
305						310			315						320	
ctt	tac	ttg	gtc	acg	agg	cat	gcc	gat	gtc	att	ccg	gtg	cgc	cg	cg	2809
Leu	Tyr	Leu	Val	Thr	Arg	His	Ala	Asp	Val	Ile	Pro	Val	Arg	Arg	Arg	
						325			330				335			
ggc	gac	agc	agg	ggg	agc	cta	ctc	tcc	ccc	agg	ccc	gtc	tcc	tac	ttg	2857
Gly	Asp	Ser	Arg	Gly	Ser	Leu	Leu	Ser	Pro	Arg	Pro	Val	Ser	Tyr	Leu	
				340			345						350			
aag	ggc	tct	tcg	ggc	ggt	cca	ctg	ctc	tgc	ccc	tcg	ggg	cac	gct	gtg	2905
Lys	Gly	Ser	Ser	Gly	Gly	Pro	Leu	Leu	Cys	Pro	Ser	Gly	His	Ala	Val	
				355			360					365				
ggc	atc	ttt	cgg	gct	gcc	gtg	tgc	acc	cga	ggg	gtt	gct	aag	gct	gtg	2953
Gly	Ile	Phe	Arg	Ala	Ala	Val	Cys	Thr	Arg	Gly	Val	Ala	Lys	Ala	Val	
				370			375				380					
gac	ttt	gta	ccc	gtc	gag	tct	atg	gaa	acc	act	atg	cg	tcc	ccg	gtc	3001
Asp	Phe	Val	Pro	Val	Glu	Ser	Met	Glu	Thr	Thr	Met	Arg	Ser	Pro	Val	
				385			390				395				400	
ttc	acg	gac	aac	tcg	tcc	cct	ccg	gcc	gta	ccg	cag	aca	tcc	cag	gtg	3049
Phe	Thr	Asp	Asn	Ser	Ser	Pro	Pro	Ala	Val	Pro	Gln	Thr	Phe	Gln	Val	
				405			410						415			
gcc	cat	cta	cac	gcc	cct	act	ggt	agc	ggc	aag	agc	act	aag	gtg	ccg	3097
Ala	His	Leu	His	Ala	Pro	Thr	Gly	Ser	Gly	Lys	Ser	Thr	Lys	Val	Pro	
				420			425						430			
gct	gcf	tat	gca	gcc	caa	ggg	tat	aag	gtg	ctt	gtc	ctg	aac	ccg	tcc	3145
Ala	Ala	Tyr	Ala	Ala	Gln	Gly	Tyr	Lys	Val	Leu	Val	Leu	Asn	Pro	Ser	
				435			440					445				
gtc	gcc	gcc	acc	cta	ggt	tcc	ggg	gcf	tat	atg	tct	aag	gca	cat	ggt	3193
Val	Ala	Ala	Thr	Leu	Gly	Phe	Gly	Ala	Tyr	Met	Ser	Lys	Ala	His	Gly	
				450			455				460					
atc	gac	cct	aac	atc	aga	acc	ggg	gta	agg	acc	atc	acc	acg	ggt	gcc	3241
Ile	Asp	Pro	Asn	Ile	Arg	Thr	Gly	Val	Arg	Thr	Ile	Thr	Thr	Gly	Ala	
				465			470				475				480	
ccc	atc	acg	tac	tcc	acc	tat	ggc	aag	ttt	ctt	gcc	gac	ggt	ggt	tgc	3289
Pro	Ile	Thr	Tyr	Ser	Thr	Tyr	Gly	Lys	Phe	Leu	Ala	Asp	Gly	Gly	Cys	
				485			490						495			
tct	ggg	ggc	gcc	tat	gac	atc	ata	ata	tgt	gat	gag	tgc	cac	tca	act	3337
Ser	Gly	Gly	Ala	Tyr	Asp	Ile	Ile	Ile	Cys	Asp	Glu	Cys	His	Ser	Thr	
				500			505						510			
gac	tcg	acc	act	atc	ctg	ggc	atc	ggc	aca	gtc	ctg	gac	caa	gct	gag	3385
Asp	Ser	Thr	Thr	Ile	Leu	Gly	Ile	Gly	Thr	Val	Leu	Asp	Gln	Ala	Glu	
				515			520					525				
acg	gct	gga	gcf	cga	ctc	gtc	gtg	ctc	gcc	acc	gct	acg	cct	ccg	gga	3433

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Thr	Ala	Gly	Ala	Arg	Leu	Val	Val	Leu	Ala	Thr	Ala	Thr	Pro	Pro	Gly	
530					535				540							
tcg	gtc	acc	gtg	cca	cat	cca	aac	atc	gag	gag	gtg	gct	ctg	tcc	agc	3481
Ser	Val	Thr	Val	Pro	His	Pro	Asn	Ile	Glu	Glu	Val	Ala	Leu	Ser	Ser	
545					550				555					560		
act	gga	gaa	atc	ccc	ttt	tat	ggc	aaa	gcc	atc	ccc	atc	gag	acc	atc	3529
Thr	Gly	Glu	Ile	Pro	Phe	Tyr	Gly	Lys	Ala	Ile	Pro	Ile	Glu	Thr	Ile	
					565			570					575			
aag	ggg	ggg	agg	cac	ctc	att	ttc	tgc	cat	tcc	aag	aag	aaa	tgt	gat	3577
Lys	Gly	Gly	Arg	His	Leu	Ile	Phe	Cys	His	Ser	Lys	Lys	Lys	Cys	Asp	
					580			585			590					
gag	ctc	gcc	gcg	aag	ctg	tcc	ggc	ctc	gga	ctc	aat	gct	gta	gca	tat	3625
Glu	Leu	Ala	Ala	Lys	Leu	Ser	Gly	Leu	Gly	Leu	Asn	Ala	Val	Ala	Tyr	
					595			600			605					
tac	ccg	ggc	ctt	gat	gta	tcc	gtc	ata	cca	act	agc	gga	gac	gtc	att	3673
Tyr	Arg	Gly	Leu	Asp	Val	Ser	Val	Ile	Pro	Thr	Ser	Gly	Asp	Val	Ile	
					610			615			620					
gtc	gta	gca	acg	gac	gct	cta	atg	acg	ggc	ttt	acc	ggc	gat	ttc	gac	3721
Val	Val	Ala	Thr	Asp	Ala	Leu	Met	Thr	Gly	Phe	Thr	Gly	Asp	Phe	Asp	
					625			630			635			640		
tca	gtg	atc	gac	tgc	aat	aca	tgt	gtc	acc	cag	aca	gtc	gac	ttc	agc	3769
Ser	Val	Ile	Asp	Cys	Asn	Thr	Cys	Val	Thr	Gln	Thr	Val	Asp	Phe	Ser	
					645			650			655					
ctg	gac	ccg	acc	ttc	acc	att	gag	acg	acg	acc	gtg	cca	caa	gac	gcg	3817
Leu	Asp	Pro	Thr	Phe	Thr	Ile	Glu	Thr	Thr	Thr	Val	Pro	Gln	Asp	Ala	
					660			665			670					
gtg	tca	cgc	tcg	cag	cgg	cga	ggc	agg	act	ggt	agg	ggc	agg	atg	ggc	3865
Val	Ser	Arg	Ser	Gln	Arg	Arg	Gly	Arg	Thr	Gly	Arg	Gly	Arg	Met	Gly	
					675			680			685					
att	tac	agg	ttt	gtg	act	cca	gga	gaa	cg	ccc	tcg	ggc	atg	ttc	gat	3913
Ile	Tyr	Arg	Phe	Val	Thr	Pro	Gly	Glu	Arg	Pro	Ser	Gly	Met	Phe	Asp	
					690			695			700					
tcc	tcg	gtt	ctg	tgc	gag	tgc	tat	gac	g	ggc	tgt	gct	tgg	tac	gag	3961
Ser	Ser	Val	Leu	Cys	Glu	Cys	Tyr	Asp	Ala	Gly	Cys	Ala	Trp	Tyr	Glu	
					705			710			715			720		
ctc	acg	ccc	gcc	gag	acc	tca	gtt	agg	ttg	cgg	gct	tac	cta	aac	aca	4009
Leu	Thr	Pro	Ala	Glu	Thr	Ser	Val	Arg	Leu	Arg	Ala	Tyr	Leu	Asn	Thr	
					725			730			735					
cca	ggg	ttg	ccc	gtc	tgc	cag	gac	cat	ctg	gag	ttc	tgg	gag	agc	gtc	4057
Pro	Gly	Leu	Pro	Val	Cys	Gln	Asp	His	Leu	Glu	Phe	Trp	Glu	Ser	Val	
					740			745			750					
ttt	aca	ggc	ctc	acc	cac	ata	gac	gcc	cat	ttc	ttg	tcc	cag	act	aag	4105
Phe	Thr	Gly	Leu	Thr	His	Ile	Asp	Ala	His	Phe	Leu	Ser	Gln	Thr	Lys	
					755			760			765					
cag	gca	gga	gac	aac	ttc	ccc	tac	ctg	gta	gca	tac	cag	gct	acg	gtg	4153
Gln	Ala	Gly	Asp	Asn	Phe	Pro	Tyr	Leu	Val	Ala	Tyr	Gln	Ala	Thr	Val	
					770			775			780					
tgc	gcc	agg	gct	cag	gct	cca	cct	cca	tcg	tgg	gac	caa	atg	tgg	aag	4201
Cys	Ala	Arg	Ala	Gln	Ala	Pro	Pro	Pro	Ser	Trp	Asp	Gln	Met	Trp	Lys	
					785			790			795			800		
tgt	ctc	ata	cg	cta	aag	cct	acg	ctg	cac	ggg	cca	acg	ccc	ctg	ctg	4249

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Substitute (12-20-05).ext																		
Cys	Leu	Ile	Arg	Leu	805	Lys	Pro	Thr	Leu	His	Gly	Pro	Thr	Pro	Leu	Leu	810	815
tat	agg	ctg	gga	gcc	gtt	caa	aac	gag	gtt	act	acc	aca	cac	ccc	ata		4297	
Tyr	Arg	Leu	Gly	Ala	Val	Gln	Asn	Glu	Val	Thr	Thr	Thr	His	Pro	Ile		820	
acc	aaa	tac	atc	atg	gca	tgc	atg	tcg	gct	gac	ctg	gag	gtc	gtc	gtc	acg		4345
Thr	Lys	Tyr	Ile	Met	Ala	Cys	Met	Ser	Ala	Asp	Leu	Glu	Val	Val	Val	Thr		835
agc	acc	tgg	gtg	ctg	gta	ggc	gga	gtc	cta	gca	gct	ctg	gcc	gcg	tat			4393
Ser	Thr	Trp	Val	Leu	Val	Gly	Gly	Val	Leu	Ala	Ala	Leu	Ala	Ala	Tyr		850	
tgc	ctg	aca	aca	ggc	agc	gtg	gtc	att	gtg	ggc	agg	atc	atc	ttg	tcc			4441
Cys	Leu	Thr	Thr	Gly	Ser	Val	Val	Ile	Val	Gly	Arg	Ile	Ile	Leu	Ser		865	
gga	aag	ccg	gcc	atc	att	ccc	gac	agg	gaa	gtc	ctt	tac	cgg	gag	ttc			4489
Gly	Lys	Pro	Ala	Ile	Ile	Pro	Asp	Arg	Glu	Val	Leu	Tyr	Arg	Glu	Phe		885	
gat	gag	atg	gaa	gag	tgc	gcc	tca	cac	ctc	cct	tac	atc	gaa	cag	gga			4537
Asp	Glu	Met	Glu	Glu	Cys	Ala	Ser	His	Leu	Pro	Tyr	Ile	Glu	Gln	Gly		900	
atg	cag	ctc	gcc	gaa	caa	ttc	aaa	cag	aag	gca	atc	ggg	ttg	ctg	caa			4585
Met	Gln	Leu	Ala	Glu	Gln	Phe	Lys	Gln	Lys	Ala	Ile	Gly	Leu	Leu	Gln		915	
aca	gcc	acc	aag	caa	gcg	gag	gct	gct	ccc	gtg	gtg	gaa	tcc	aag				4633
Thr	Ala	Thr	Lys	Gln	Ala	Glu	Ala	Ala	Ala	Pro	Val	Val	Glu	Ser	Lys		930	
tgg	cgg	acc	ctc	gaa	gcc	ttc	tgg	gcg	aag	cat	atg	tgg	aat	ttc	atc			4681
Trp	Arg	Thr	Leu	Glu	Ala	Phe	Trp	Ala	Lys	His	Met	Trp	Asn	Phe	Ile		945	
agc	ggg	ata	caa	tat	tta	gca	ggc	ttg	tcc	act	ctg	cct	ggc	aac	ccc			4729
Ser	Gly	Ile	Gln	Tyr	Leu	Ala	Gly	Leu	Ser	Thr	Leu	Pro	Gly	Asn	Pro		965	
gcg	ata	gca	tca	ctg	atg	gca	ttc	aca	gcc	tct	atc	acc	agc	ccg	ctc			4777
Ala	Ile	Ala	Ser	Leu	Met	Ala	Phe	Thr	Ala	Ser	Ile	Thr	Ser	Pro	Leu		980	
acc	acc	caa	cat	acc	ctc	ctg	ttt	aac	atc	ctg	ggg	gga	tgg	gtg	gcc			4825
Thr	Thr	Gln	His	Thr	Leu	Leu	Phe	Asn	Ile	Leu	Gly	Gly	Trp	Val	Ala		995	
gcc	caa	ctt	gct	cct	ccc	agc	gct	gct	tct	gct	ttc	gta	ggc	gcc	ggc			4873
Ala	Gln	Leu	Ala	Pro	Pro	Ser	Ala	Ala	Ser	Ala	Phe	Val	Gly	Ala	Gly		1010	
atc	gct	gga	gcg	gct	gtt	ggc	agc	ata	ggc	ctt	ggg	aag	gtg	ctt	gtg			4921
Ile	Ala	Gly	Ala	Ala	Val	Gly	Ser	Ile	Gly	Leu	Gly	Lys	Val	Leu	Val		1025	
gat	att	ttg	gca	ggt	tat	gga	gca	ggg	gtg	gca	ggc	gcf	ctc	gtg	gcc			4969
Asp	Ile	Leu	Ala	Gly	Tyr	Gly	Ala	Gly	Val	Ala	Gly	Ala	Leu	Val	Ala		1045	
ttt	aag	gtc	atg	agc	ggc	gag	atg	ccc	tcc	acc	gag	gac	ctg	gtt	aac			5017
Phe	Lys	Val	Met	Ser	Gly	Glu	Met	Pro	Ser	Thr	Glu	Asp	Leu	Val	Asn		1060	
cta	ctc	cct	gct	atc	ctc	tcc	cct	ggc	gcc	cta	gtc	gtc	ggg	gtc	gtg			5065

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Leu	Leu	Pro	Ala	Ile	Leu	Ser	Pro	Gly	Ala	Leu	Val	Val	Gly	Val	Val	
1075					1080						1085					
tgc	gca	gct	ata	ctg	cgt	cgg	cac	gtg	ggc	cca	ggg	gag	ggg	gct	gtg	5113
Cys	Ala	Ala	Ile	Leu	Arg	Arg	His	Val	Gly	Pro	Gly	Glu	Gly	Ala	Val	
1090					1095						1100					
cag	tgg	atg	aac	cgg	ctg	ata	gct	ttc	gct	tcg	cgg	ggt	aac	cac	gtc	5161
Gln	Trp	Met	Asn	Arg	Leu	Ile	Ala	Phe	Ala	Ser	Arg	Gly	Asn	His	Val	
1105					1110					1115					1120	
tcc	ccc	acg	cac	tat	gtg	cct	gag	agc	gac	gct	gca	gca	cgt	gtc	act	5209
Ser	Pro	Thr	His	Tyr	Val	Pro	Glu	Ser	Asp	Ala	Ala	Ala	Arg	Val	Thr	
					1125				1130					1135		
cag	atc	ctc	tct	agt	ctt	acc	atc	act	cag	ctg	ctg	aag	agg	ctt	cac	5257
Gln	Ile	Leu	Ser	Ser	Leu	Thr	Ile	Thr	Gln	Leu	Leu	Lys	Arg	Leu	His	
					1140				1145					1150		
cag	tgg	atc	aac	gag	gac	tgc	tcc	acg	cca	tgc	tcc	ggc	tcg	tgg	cta	5305
Gln	Trp	Ile	Asn	Glu	Asp	Cys	Ser	Thr	Pro	Cys	Ser	Gly	Ser	Trp	Leu	
					1155				1160					1165		
aga	gat	gtt	tgg	gat	tgg	ata	tgc	acg	gtg	ttg	act	gat	ttc	aag	acc	5353
Arg	Asp	Val	Trp	Asp	Trp	Ile	Cys	Thr	Val	Leu	Thr	Asp	Phe	Lys	Thr	
					1170				1175					1180		
tgg	ctc	cag	tcc	aag	ctc	ctg	ccg	cga	ttg	ccg	gga	gtc	ccc	tcc	tcc	5401
Trp	Leu	Gln	Ser	Lys	Leu	Leu	Pro	Arg	Leu	Pro	Gly	Val	Pro	Phe	Phe	
					1185				1190					1195		1200
tca	tgt	caa	cgt	ggg	tac	aag	gga	gtc	tgg	cg	ggc	gac	ggc	atc	atg	5449
Ser	Cys	Gln	Arg	Gly	Tyr	Lys	Gly	Val	Trp	Arg	Gly	Asp	Gly	Ile	Met	
					1205				1210					1215		
caa	acc	acc	tgc	cca	tgt	gga	gca	cag	atc	acc	gga	cat	gtg	aaa	aac	5497
Gln	Thr	Thr	Cys	Pro	Cys	Gly	Ala	Gln	Ile	Thr	Gly	His	Val	Lys	Asn	
					1220				1225					1230		
ggt	tcc	atg	agg	atc	gtg	ggg	cct	agg	acc	tgt	agt	aac	acg	tgg	cat	5545
Gly	Ser	Met	Arg	Ile	Val	Gly	Pro	Arg	Thr	Cys	Ser	Asn	Thr	Trp	His	
					1235				1240					1245		
gga	aca	tcc	ccc	att	aac	gcg	tac	acc	acg	ggc	ccc	tgc	acg	ccc	tcc	5593
Gly	Thr	Phe	Pro	Ile	Asn	Ala	Tyr	Thr	Thr	Gly	Pro	Cys	Thr	Pro	Ser	
					1250				1255					1260		
ccg	gct	cca	aat	tat	tct	agg	gct	ctg	tgg	cg	gtg	gct	gct	gag	gag	5641
Pro	Ala	Pro	Asn	Tyr	Ser	Arg	Ala	Leu	Trp	Arg	Val	Ala	Ala	Glu	Glu	
					1265				1270					1275		1280
tac	gtg	gag	gtt	acg	cg	gtg	ggg	gat	ttc	cac	tac	gtg	acg	ggc	atg	5689
Tyr	Val	Glu	Val	Thr	Arg	Val	Gly	Asp	Phe	His	Tyr	Val	Thr	Gly	Met	
					1285				1290					1295		
acc	act	gac	aac	gta	aag	tgc	ccg	tgt	cag	gtt	ccg	gcc	ccc	gaa	tcc	5737
Thr	Thr	Asp	Asn	Val	Lys	Cys	Pro	Cys	Gln	Val	Pro	Ala	Pro	Glu	Phe	
					1300				1305					1310		
ttc	aca	gaa	gtg	gat	ggg	gtg	cg	ttg	cac	agg	tac	gt	cca	gct	tgc	5785
Phe	Thr	Glu	Val	Asp	Gly	Val	Arg	Leu	His	Arg	Tyr	Ala	Pro	Ala	Cys	
					1315				1320					1325		
aaa	ccc	ctc	cta	cg	gag	gtc	aca	tcc	ctg	gtc	ggg	ctc	aat	caa		5833
Lys	Pro	Leu	Leu	Arg	Glu	Glu	Val	Thr	Phe	Leu	Val	Gly	Leu	Asn	Gln	
					1330				1335					1340		
tac	ctg	gtt	ggg	tca	cag	ctc	cca	tgc	gag	ccc	gaa	ccg	gac	gta	gca	5881

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Thr	Gly	Ala	Leu	Ile	Thr	Pro	Cys	Ala	Ala	Glu	Glu	Thr	Lys	Leu	Pro		
1620					1625								1630				
atc	aat	gca	ctg	agc	aac	tct	ttg	ctc	cgt	cac	cac	aac	ttg	gtc	tat	6745	
Ile	Asn	Ala	Leu	Ser	Asn	Ser	Leu	Leu	Arg	His	His	Asn	Leu	Val	Tyr		
1635					1640								1645				
gct	aca	aca	tct	cgc	agc	gca	agc	ctg	cg	cag	aag	aag	gtc	acc	ttt	6793	
Ala	Thr	Thr	Ser	Arg	Ser	Ala	Ser	Leu	Arg	Gln	Lys	Lys	Val	Thr	Phe		
1650					1655						1660						
gac	aga	ctg	cag	gtc	ctg	gac	gac	cac	tac	cg	gac	gt	ctc	aag	gag	6841	
Asp	Arg	Leu	Gln	Val	Leu	Asp	Asp	His	Tyr	Arg	Asp	Val	Leu	Lys	Glu		
1665					1670					1675				1680			
atg	aag	gcg	aag	gcg	tcc	aca	gtt	aag	gct	aaa	ctt	cta	tcc	gt	gag	6889	
Met	Lys	Ala	Lys	Ala	Ser	Thr	Val	Lys	Ala	Lys	Leu	Leu	Ser	Val	Glu		
1685							1690							1695			
gaa	gcc	tgt	aag	ctg	acg	ccc	cca	cat	tcg	gcc	aga	tct	aaa	ttt	ggc	6937	
Glu	Ala	Cys	Lys	Leu	Thr	Pro	Pro	His	Ser	Ala	Arg	Ser	Lys	Phe	Gly		
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Tyr	Gly	Ala	Lys	Asp	Val	Arg	Asn	Leu	Ser	Ser	Lys	Ala	Val	Asn	His		
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Ile	Arg	Ser	Val	Trp	Lys	Asp	Leu	Glu	Asp	Thr	Glu	Thr	Pro	Ile			
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Asp	Thr	Thr	Ile	Met	Ala	Lys	Asn	Glu	Val	Phe	Cys	Val	Gln	Pro	Glu		
1745					1750					1755				1760			
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Lys	Gly	Gly	Arg	Lys	Pro	Ala	Arg	Leu	Ile	Val	Phe	Pro	Asp	Leu	Gly		
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Val	Arg	Val	Cys	Glu	Lys	Met	Ala	Leu	Tyr	Asp	Val	Val	Ser	Thr	Leu		
1780							1785							1790			
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Pro	Gln	Ala	Val	Met	Gly	Ser	Ser	Tyr	Gly	Phe	Gln	Tyr	Ser	Pro	Gly		
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cag	cg	gtc	gag	t	tc	ctg	gt	aat	gcc	tgg	aaa	g	aag	aaa	tgc	cct	7273
Gln	Arg	Val	Glu	Phe	Leu	Val	Asn	Ala	Trp	Lys	Ala	Lys	Lys	Cys	Pro		
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Met	Gly	Phe	Ala	Tyr	Asp	Thr	Arg	Cys	Phe	Asp	Ser	Thr	Val	Thr	Glu		
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aat	gac	atc	cgt	gtt	gag	gag	tca	atc	tac	caa	tgt	tgt	gac	ttg	gcc	7369	
Asn	Asp	Ile	Arg	Val	Glu	Glu	Ser	Ile	Tyr	Gln	Cys	Cys	Asp	Leu	Ala		
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ccc	gaa	gcc	aga	cag	gcc	ata	agg	tcg	ctc	aca	gag	cg	ctt	tac	atc	7417	
Pro	Glu	Ala	Arg	Gln	Ala	Ile	Arg	Ser	Leu	Thr	Glu	Arg	Leu	Tyr	Ile		
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ggg	ggc	ccc	ctg	act	aat	tct	aaa	ggg	cag	aac	tgc	ggc	tat	cgc	cg	7465	
Gly	Gly	Pro	Leu	Thr	Asn	Ser	Lys	Gly	Gln	Asn	Cys	Gly	Tyr	Arg	Arg		
1875							1880							1885			
tgc	cgc	g	gt	g	tt	ac	tg	ac	tg	gg	t	ac	cc	tc	ac	7513	

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Cys	Arg	Ala	Ser	Gly	Val	Leu	Thr	Thr	Ser	Cys	Gly	Asn	Thr	Leu	Thr	
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Cys	Tyr	Leu	Lys	Ala	Ala	Ala	Ala	Cys	Arg	Ala	Ala	Lys	Leu	Gln	Asp	
1905					1910					1915					1920	
tgc	acg	atg	ctc	gta	tgc	gga	gac	gac	ctt	gtc	gtt	atc	tgt	gaa	agc	7609
Cys	Thr	Met	Leu	Val	Cys	Gly	Asp	Asp	Leu	Val	Val	Ile	Cys	Glu	Ser	
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gcg	ggg	acc	caa	gag	gac	gag	gcg	agc	cta	cgg	gcc	ttc	acg	gag	gct	7657
Ala	Gly	Thr	Gln	Glu	Asp	Glu	Ala	Ser	Leu	Arg	Ala	Phe	Thr	Glu	Ala	
					1940				1945			1950				
atg	act	aga	tac	tct	gcc	ccc	cct	ggg	gac	ccg	ccc	aaa	cca	gaa	tac	7705
Met	Thr	Arg	Tyr	Ser	Ala	Pro	Pro	Gly	Asp	Pro	Pro	Lys	Pro	Glu	Tyr	
					1955			1960			1965					
gac	ttg	gag	ttg	ata	aca	tca	tgc	tcc	tcc	aat	gtg	tca	gtc	gcg	cac	7753
Asp	Leu	Glu	Leu	Ile	Thr	Ser	Cys	Ser	Ser	Asn	Val	Ser	Val	Ala	His	
					1970			1975			1980					
gat	gca	tct	ggc	aaa	agg	gtg	tac	tat	ctc	acc	cgt	gac	ccc	acc	acc	7801
Asp	Ala	Ser	Gly	Lys	Arg	Val	Tyr	Tyr	Leu	Thr	Arg	Asp	Pro	Thr	Thr	
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ccc	ctt	gcf	cgg	gct	gcf	tgg	gag	aca	gct	aga	cac	act	cca	gtc	aat	7849
Pro	Leu	Ala	Arg	Ala	Ala	Trp	Glu	Thr	Ala	Arg	His	Thr	Pro	Val	Asn	
					2005			2010			2015					
tcc	tgg	cta	ggc	aac	atc	atc	atg	tat	gcf	ccc	acc	ttg	tgg	gca	agg	7897
Ser	Trp	Leu	Gly	Asn	Ile	Ile	Met	Tyr	Ala	Pro	Thr	Leu	Trp	Ala	Arg	
					2020			2025			2030					
atg	atc	ctg	atg	act	cat	ttc	ttc	atc	ctt	cta	gct	cag	gaa	caa		7945
Met	Ile	Leu	Met	Thr	His	Phe	Phe	Ser	Ile	Leu	Leu	Ala	Gln	Glu	Gln	
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Leu	Glu	Lys	Ala	Leu	Asp	Cys	Gln	Ile	Tyr	Gly	Ala	Cys	Tyr	Ser	Ile	
					2050			2055			2060					
gag	cca	ctt	gac	cta	cct	cag	atc	att	caa	cga	ctc	cac	ggc	ctt	agc	8041
Glu	Pro	Leu	Asp	Leu	Pro	Gln	Ile	Ile	Gln	Arg	Leu	His	Gly	Leu	Ser	
					2065			2070			2075			2080		
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Ala	Phe	Ser	Leu	His	Ser	Tyr	Ser	Pro	Gly	Glu	Ile	Asn	Arg	Val	Ala	
					2085			2090			2095					
tca	tgc	ctc	agg	aaa	ctt	ggg	gta	ccg	ccc	ttg	cga	gtc	tgg	aga	cat	8137
Ser	Cys	Leu	Arg	Lys	Leu	Gly	Val	Pro	Pro	Leu	Arg	Val	Trp	Arg	His	
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cgf	gcc	aga	agt	gtc	cgc	gct	agg	cta	ctg	tcc	cag	ggg	ggg	agg	gct	8185
Arg	Ala	Arg	Ser	Val	Arg	Ala	Arg	Leu	Leu	Ser	Gln	Gly	Gly	Arg	Ala	
					2115			2120			2125					
gcc	act	tgt	ggc	aag	tac	ctc	ttc	aac	tgg	gca	gta	agg	acc	aag	ctc	8233
Ala	Thr	Cys	Gly	Lys	Tyr	Leu	Phe	Asn	Trp	Ala	Val	Arg	Thr	Lys	Leu	
					2130			2135			2140					
aaa	ctc	act	cca	atc	ccg	gct	gcg	tcc	cag	ttg	gat	tta	tcc	agc	tgg	8281
Lys	Leu	Thr	Pro	Ile	Pro	Ala	Ala	Ser	Gln	Leu	Asp	Leu	Ser	Ser	Trp	
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ttc	gtt	gct	ggt	tac	agc	ggg	gga	gac	ata	tat	cac	agc	ctg	tct	cgt	8329

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Phe Val Ala Gly Tyr Ser Gly Gly Asp Ile Tyr His Ser Leu Ser Arg
2165 2170 2175

gcc cga ccc cgc tgg ttc atg tgg tgc cta ctc cta ctt tct gta ggg 8377
Ala Arg Pro Arg Trp Phe Met Trp Cys Leu Leu Leu Ser Val Gly
2180 2185 2190

gta ggc atc tat cta ctc ccc aac cga tga acggggagct aaacactcca 8427
Val Gly Ile Tyr Leu Leu Pro Asn Arg *
2195 2200

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Met Asp Arg Glu Met Ala Ala Ser Cys Gly Gly Ala Val Phe Val Gly
1 5 10 15

ctg ata ctc ttg acc ttg tca ccg cac tat aag ctg ttc ctc gct agg 1897
Leu Ile Leu Leu Thr Leu Ser Pro His Tyr Lys Leu Phe Leu Ala Arg
20 25 30

ctc ata tgg tgg tta caa tat ttt atc acc agg gcc gag gca cac ttg 1945
Leu Ile Trp Trp Leu Gln Tyr Phe Ile Thr Arg Ala Glu Ala His Leu
35 40 45

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caa gtg tgg atc ccc ccc ctc aac gtt cg _g ggg ggc cgc gat gcc gtc Gln Val Trp Ile Pro Pro Leu Asn Val Arg Gly Gly Arg Asp Ala Val	1993
50 55 60	
atc ctc ctc acg tgc gc _g atc cac cca gag cta atc ttt acc atc acc Ile Leu Leu Thr Cys Ala Ile His Pro Glu Leu Ile Phe Thr Ile Thr	2041
65 70 75 80	
aaa atc ttg ctc gcc ata ctc ggt cca ctc atg gtg ctc cag gct ggt Lys Ile Leu Leu Ala Ile Leu Gly Pro Leu Met Val Leu Gln Ala Gly	2089
85 90 95	
ata acc aaa gtg ccg tac ttc gtg cgc gca cac ggg ctc att cgt gca Ile Thr Lys Val Pro Tyr Phe Val Arg Ala His Gly Leu Ile Arg Ala	2137
100 105 110	
tgc atg ctg gtg cgg aag gtt gct ggg ggt cat tat gtc caa atg gct Cys Met Leu Val Arg Lys Val Ala Gly Gly His Tyr Val Gln Met Ala	2185
115 120 125	
ctc atg aag ttg gcc gca ctg aca ggt acg tac gtt tat gac cat ctc Leu Met Lys Leu Ala Ala Leu Thr Gly Thr Tyr Val Tyr Asp His Leu	2233
130 135 140	
acc cca ctg cgg gac tgg gcc cac gcg ggc cta cga gac ctt gcg gtg Thr Pro Leu Arg Asp Trp Ala His Ala Gly Leu Arg Asp Leu Ala Val	2281
145 150 155 160	
gca gtt gag ccc gtc gtc ttc tct gat atg gag acc aag gtt atc acc Ala Val Glu Pro Val Val Phe Ser Asp Met Glu Thr Lys Val Ile Thr	2329
165 170 175	
tgg ggg gca gac acc gcg gcg tgt ggg gac atc atc ttg ggc ctg ccc Trp Gly Ala Asp Thr Ala Ala Cys Gly Asp Ile Ile Leu Gly Leu Pro	2377
180 185 190	
tgg tcc gcc cgc agg ggg agg gag ata cat ctg gga c _{cg} gca gac agc Val Ser Ala Arg Arg Gly Arg Glu Ile His Leu Gly Pro Ala Asp Ser	2425
195 200 205	
ctt gaa ggg cag ggg tgg cga ctc ctc gcg cct att acg gcc tac tcc Leu Glu Gly Gln Gly Trp Arg Leu Leu Ala Pro Ile Thr Ala Tyr Ser	2473
210 215 220	
caa cag acg cga ggc cta ctt ggc tgc atc atc acc agc ctc aca ggc Gln Gln Thr Arg Gly Leu Leu Gly Cys Ile Ile Thr Ser Leu Thr Gly	2521
225 230 235 240	
cgg gac agg aac cag gtc gag ggg gag gtc caa gtg gtc tcc acc gca Arg Asp Arg Asn Gln Val Glu Gly Glu Val Gln Val Ser Thr Ala	2569
245 250 255	
aca caa tct ttc ctg gc _g acc tgc gtc aat ggc gtg tgt tgg act gtc Thr Gln Ser Phe Leu Ala Thr Cys Val Asn Gly Val Cys Trp Thr Val	2617
260 265 270	
tat cat ggt gcc ggc tca aag acc ctt gcc ggc cca aag ggc cca atc Tyr His Gly Ala Gly Ser Lys Thr Leu Ala Gly Pro Lys Gly Pro Ile	2665
275 280 285	
acc caa atg tac acc aat gtg gac cag gac ctc gtc ggc tgg caa ggc Thr Gln Met Tyr Thr Asn Val Asp Gln Asp Leu Val Gly Trp Gln Ala	2713
290 295 300	
ccc ccc ggg gcg cgt tcc ttg aca cca tgc acc tgc ggc agc tcg gac Pro Pro Gly Ala Arg Ser Leu Thr Pro Cys Thr Cys Gly Ser Ser Asp	2761
305 310 315 320	

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Leu Tyr Leu Val Thr Lys His Ala Asp Val Ile Pro Val Arg Arg Arg	
325 330 335	
ggc gac agc agg ggg agc cta ctc tcc ccc cgg ccc gtc tcc tac ttg	2857
Gly Asp Ser Arg Gly Ser Leu Leu Ser Pro Arg Pro Val Ser Tyr Leu	
340 345 350	
aag ggc tct tcg ggc ggt cca ctg ctc tgc ccc tcg ggg cac gct gtg	2905
Lys Gly Ser Ser Gly Gly Pro Leu Leu Cys Pro Ser Gly His Ala Val	
355 360 365	
ggc atc ttt cgg gct gcc gtg tgc acc cga ggg gtt gcg aag gcg gtg	2953
Gly Ile Phe Arg Ala Ala Val Cys Thr Arg Gly Val Ala Lys Ala Val	
370 375 380	
gac ttt gta ccc gtc gag tct atg gaa acc act atg cgg tcc ccg gtc	3001
Asp Phe Val Pro Val Glu Ser Met Glu Thr Thr Met Arg Ser Pro Val	
385 390 395 400	
ttc acg gac aac tcg tcc cct ccg gcc gta ccg cag aca ttc cag gtg	3049
Phe Thr Asp Asn Ser Ser Pro Pro Ala Val Pro Gln Thr Phe Gln Val	
405 410 415	
gcc cat cta cac gcc cct act ggt agc ggc aag agc act aag gtg ccg	3097
Ala His Leu His Ala Pro Thr Gly Ser Gly Lys Ser Thr Lys Val Pro	
420 425 430	
gct gcg tat gca gcc caa ggg tat aag gtg ctt gtc ctg aac ccg tcc	3145
Ala Ala Tyr Ala Ala Gln Gly Tyr Lys Val Leu Val Leu Asn Pro Ser	
435 440 445	
gtc gcc acc cta ggt ttc ggg gcg tat atg tct aag gca cat ggt	3193
Val Ala Ala Thr Leu Gly Phe Gly Ala Tyr Met Ser Lys Ala His Gly	
450 455 460	
atc gac cct aac atc aga acc ggg gta agg acc atc acc acg ggt gcc	3241
Ile Asp Pro Asn Ile Arg Thr Gly Val Arg Thr Ile Thr Thr Gly Ala	
465 470 475 480	
ccc atc acg tac tcc acc tat ggc aag ttt ctt gcc gac ggt ggt tgc	3289
Pro Ile Thr Tyr Ser Thr Tyr Gly Lys Phe Leu Ala Asp Gly Gly Cys	
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Ser Gly Gly Ala Tyr Asp Ile Ile Ile Cys Asp Glu Cys His Ser Thr	
500 505 510	
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Asp Ser Thr Thr Ile Leu Gly Ile Gly Thr Val Leu Asp Gln Ala Glu	
515 520 525	
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Thr Ala Gly Ala Arg Leu Val Val Leu Ala Thr Ala Thr Pro Pro Gly	
530 535 540	
tcg gtc acc gtg cca cat cca aac atc gag gag gtg gct ctg tcc agc	3481
Ser Val Thr Val Pro His Pro Asn Ile Glu Glu Val Ala Leu Ser Ser	
545 550 555 560	
act gga gaa atc ccc ttt tat ggc aaa gcc atc ccc atc gag acc atc	3529
Thr Gly Glu Ile Pro Phe Tyr Gly Lys Ala Ile Pro Ile Glu Thr Ile	
565 570 575	
aag ggg ggg agg cac ctc att ttc tgc cat tcc aag aag aaa tgc gat	3577
Lys Gly Gly Arg His Leu Ile Phe Cys His Ser Lys Lys Lys Cys Asp	
580 585 590	

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gag ctc gcc gcg aag ctg tcc ggc ctc gga ctc aat gct gta gca tat Glu Leu Ala Ala Lys Leu Ser Gly Leu Gly Leu Asn Ala Val Ala Tyr 595	3625
600	605
tac cgg ggc ctt gat gta tcc gtc ata cca act agc gga gac gtc att Tyr Arg Gly Leu Asp Val Ser Val Ile Pro Thr Ser Gly Asp Val Ile 610	3673
615	620
gtc gta gca acg gac gct cta atg acg ggc ttt acc ggc gat ttc gac Val Val Ala Thr Asp Ala Leu Met Thr Gly Phe Thr Gly Asp Phe Asp 625	3721
630	635
640	
tca gtg atc gac tgc aat aca tgt gtc acc cag aca gtc gac ttc agc Ser Val Ile Asp Cys Asn Thr Cys Val Thr Gin Thr Val Asp Phe Ser 645	3769
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ctg gac ccg acc ttc acc att gag acg acg acc gtg cca caa gac gcg Leu Asp Pro Thr Phe Thr Ile Glu Thr Thr Thr Val Pro Gin Asp Ala 660	3817
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680	685
att tac agg ttt gtg act cca gga gaa cgg ccc tcg ggc atg ttc gat Ile Tyr Arg Phe Val Thr Pro Gly Glu Arg Pro Ser Gly Met Phe Asp 690	3913
695	700
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710	715
720	
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730	735
cca ggg ttg ccc gtc tgc cag gac cat ctg gag ttc tgg gag ggc gtc Pro Gly Leu Pro Val Cys Gln Asp His Leu Glu Phe Trp Glu Gly Val 740	4057
745	750
ttt aca ggc ctc acc cac ata gac gcc cat ttc ttg tcc cag act aag Phe Thr Gly Leu Thr His Ile Asp Ala His Phe Leu Ser Gln Thr Lys 755	4105
760	765
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775	780
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790	795
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810	815
820	
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830	
acc aaa tac atc atg gca tgc atg tcg gct gac ctg gag gtc gtc acg Thr Lys Tyr Ile Met Ala Cys Met Ser Ala Asp Leu Glu Val Val Thr 835	4345
840	845
850	
855	860
860	

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tgc ctg aca aca ggc	865	arg gtg gtc att gtg	870	ggc agg atc atc ttg	875	tcc	880	4441
Cys Leu Thr Thr Gly		Ser Val Val Ile Val		Gly Arg Ile Ile Leu		Ser		
gga agg ccg gcc atc	885	att ccc gac agg gaa	890	gtc ctt tac cgg gag	895	ttc		4489
Gly Arg Pro Ala Ile		Ile Pro Asp Arg		Glu Val Leu Tyr Arg		Glu Phe		
atg gag atg gaa gag		tgt gcc tca cac		ctc cct tac atc gaa		cag gga		4537
Asp Glu Met Glu Glu		Cys Ala Ser His		Leu Pro Tyr Ile Glu		Gln Gln Gly		
900		905		910				
atg cag ctc gcc gaa	915	caa ttc aaa cag	920	aag gca atc ggg ttg	925	ctg caa		4585
Met Gln Leu Ala Glu		Gln Phe Lys Gln		Ala Ile Gly Leu Leu		Gln		
930		935		940				
aca gcc acc aag caa		gca gcg gag gct		gct gct ccc gtg		gtg gaa tcc aag		4633
Thr Ala Thr Lys Gln		Ala Glu Ala Ala		Pro Val Val Glu Ser		Lys		
945		950		955				
tg ^g cg ^g acc ctc gaa		gcc ttc tgg		g ^c a ^a g ^t a ^t g ^t g ^a t ^t c ^t a ^c		t ^t c ^t a ^t c ^t g ^g a ^a c ^c c ^c		4681
Trp Arg Thr Leu Glu		Ala Phe Trp Ala		Lys His Met Trp Asn Phe		Ile		
965		970		975				
agc ggg ata caa tat		tta gca ggc ttg		tcc act ctg cct ggc		aac ccc		4729
Ser Gly Ile Gln Tyr		Leu Ala Gly Leu		Ser Thr Leu Pro Gly		Asn Pro		
980		985		990				
gc ^g at ^a g ^c a ^t c ^t g ^t		at ^g g ^c a ^t t ^t c ^c a ^c g ^c t ^t c ^t a ^t c ^c a ^c g ^c c ^c		ct ^c 4777				
Ala Ile Ala Ser Leu		Met Ala Phe Thr		Ala Ser Ile Thr Ser		Pro Leu		
995		1000		1005				
acc acc caa cat acc		ctc ctg ttt aac		atc ctg ggg gga tgg		gtg gcc		4825
Thr Thr Gln His		Leu Phe Asn Ile		Leu Gly Gly Trp Val		Ala		
1010		1015		1020				
gc ^c ca ^a ct ^t g ^c t ^t c ^c a ^g c ^g g ^c t ^c t ^t g ^t a ^g g ^t c ^t t ^t g ^t		g ^c t ^t g ^t a ^g g ^t c ^t t ^t g ^t a ^g g ^t c ^t t ^t g ^t		4873				
Ala Gln Leu Ala Pro		Pro Ser Ala Ala		Ser Ala Phe Val Gly		Ala Gly		
1025		1030		1035		1040		
atc g ^c t ^t g ^g a ^g g ^c g ^c t ^t g ^g a ^g g ^c a ^t g ^c c ^t t ^t g ^t g ^t		g ^c a ^t g ^c c ^t t ^t g ^t a ^g g ^t c ^t t ^t g ^t g ^t		4921				
Ile Ala Gly Ala Ala		Val Gly Ser Ile Gly		Leu Gly Lys Val Leu		Val Val		
1045		1050		1055				
ttt a ^a g ^t c ^t a ^t g ^c g ^c g ^a t ^t g ^c c ^c t ^t c ^c a ^c g ^t g ^t a ^a		g ^c t ^t a ^c g ^t g ^t a ^a c ^t g ^t g ^t a ^a		5017				
Phe Lys Val Met Ser		Gly Glu Met Pro		Ser Thr Glu Asp Leu		Val Asn		
1060		1065		1070				
cta ctc cct gct atc		ctc tcc cct ggc		gcc cta gtc gtc		ggg gtc gt ^g		5065
Leu Leu Pro Ala Ile		Leu Ser Pro		Gly Ala Leu Val		Val Gly Val Val		
1075		1080		1085				
tgc g ^c a ^t c ^t g ^t c ^t g ^g c ^a g ^t g ^g c ^c g ^g g ^g g ^g g ^c t ^t g ^t		g ^c t ^t g ^t a ^g g ^t c ^t t ^t g ^t g ^t a ^g g ^t c ^t t ^t g ^t		5113				
Cys Ala Ala Ile Leu		Arg Arg His Val		Gly Pro Gly Glu Gly		Ala Val		
1090		1095		1100				
cag t ^g g ^t a ^a c ^g c ^t g ^t a ^t g ^c t ^t g ^c t ^c c ^g g ^g g ^t a ^a c ^c c ^t		g ^c t ^t g ^t a ^g g ^t c ^t t ^t g ^t g ^t a ^g g ^t c ^t t ^t g ^t		5161				
Gln Trp Met Asn Arg		Leu Ile Ala Phe		Ala Ser Arg Gly		Asn His Val		
1105		1110		1115		1120		
tcc ccc ac ^g c ^a c ^t g ^t c ^c t ^t g ^a a ^g g ^c g ^c g ^c c ^g g ^t a ^c a ^t		g ^c t ^t g ^t a ^g g ^t c ^t t ^t g ^t g ^t a ^g g ^t c ^t t ^t g ^t		5209				
Ser Pro Thr His Tyr		Val Pro Glu Ser		Asp Ala Ala Arg		Val Thr		
1125		1130		1135				

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cag atc ctc tct agt ctt acc atc act cag ctg ctg aag agg ctt cac Gln Ile Leu Ser Ser Leu Thr Ile Thr Gln Leu Leu Lys Arg Leu His 1140 1145 1150	5257
cag tgg atc aac gag gac tgc tcc acg cca tgc tcc ggc tcg tgg cta Gln Trp Ile Asn Glu Asp Cys Ser Thr Pro Cys Ser Gly Ser Trp Leu 1155 1160 1165	5305
aga gat gtt tgg gat tgg ata tgc acg gtg ttg act gat ttc aag gcc Arg Asp Val Trp Asp Trp Ile Cys Thr Val Leu Thr Asp Phe Lys Ala 1170 1175 1180	5353
tgg ctc cag tcc aag ctc ctg ccg cga ttg ccg gga gtc ccc ttc ttc Trp Leu Gln Ser Lys Leu Leu Pro Arg Leu Pro Gly Val Pro Phe Phe 1185 1190 1195 1200	5401
tca tgt caa cgt ggg tac aag gga gtc tgg ccg ggc gac ggc atc atg Ser Cys Gln Arg Gly Tyr Lys Gly Val Trp Arg Gly Asp Gly Ile Met 1205 1210 1215	5449
caa acc acc tgc cca tgt gga gca cag atc acc gga cat gtg aaa aac Gln Thr Thr Cys Pro Cys Gly Ala Gln Ile Thr Gly His Val Lys Asn 1220 1225 1230	5497
tgt tcc atg agg atc gtg ggg cct agg acc tgt agt aac acg tgg cat Cys Ser Met Arg Ile Val Gly Pro Arg Thr Cys Ser Asn Thr Trp His 1235 1240 1245	5545
gga aca ttc ccc att aac gcg tac acc acg ggc ccc tgc acg ccc tcc Gly Thr Phe Pro Ile Asn Ala Tyr Thr Thr Gly Pro Cys Thr Pro Ser 1250 1255 1260	5593
ccg gcg cca aat tat tct agg gcg ctg tgg ccg gtg gct gct gag gag Pro Ala Pro Asn Tyr Ser Arg Ala Leu Trp Arg Val Ala Ala Glu Glu 1265 1270 1275 1280	5641
tac gtg gag gtt acg cga gtg ggg gat ttc cac tac gtg acg ggc atg Tyr Val Glu Val Thr Arg Val Gly Asp Phe His Tyr Val Thr Gly Met 1285 1290 1295	5689
acc act gac aac gta aag tgc ccg tgt cag gtt ccg gcc ccc gaa ttc Thr Thr Asp Asn Val Lys Cys Pro Cys Gln Val Pro Ala Pro Glu Phe 1300 1305 1310	5737
ttc aca gaa gtg gat ggg gtg cggtt cac agg tac gct cca gcg tgc Phe Thr Glu Val Asp Gly Val Arg Leu His Arg Tyr Ala Pro Ala Cys 1315 1320 1325	5785
aaa ccc ctc cta cgg gag gag gtc aca ttc ctg gtc ggg ctc aat caa Lys Pro Leu Leu Arg Glu Glu Val Thr Phe Leu Val Gly Leu Asn Gln 1330 1335 1340	5833
tac ccg gtt ggg tca cag ctc cca tgc gag ccc gaa ctg gac gta gca Tyr Pro Val Gly Ser Gln Leu Pro Cys Glu Pro Glu Leu Asp Val Ala 1345 1350 1355 1360	5881
gtg ctc act tcc atg ctc acc gac ccc tcc cac att acg gcg gag acg Val Leu Thr Ser Met Leu Thr Asp Pro Ser His Ile Thr Ala Glu Thr 1365 1370 1375	5929
gct aag cgt agg ctg gcc agg gga tct ccc ccc tcc ttg gcc agc tca Ala Lys Arg Arg Leu Ala Arg Gly Ser Pro Pro Ser Leu Ala Ser Ser 1380 1385 1390	5977
tca gct agc cag ctg tct gcg cct tcc ttg aag gca aca tgc act acc Ser Ala Ser Gln Leu Ser Ala Pro Ser Leu Lys Ala Thr Cys Thr Thr 1395 1400 1405	6025

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cgt cat gac tcc ccg gac gct gac ctc atc gag gcc aac ctc ctg tgg	6073
Arg His Asp Ser Pro Asp Ala Asp Leu Ile Glu Ala Asn Leu Leu Trp	
1410 1415 1420	
cgg cag gag atg ggc ggg aac atc acc cgc gtg gag tca gag aat aag	6121
Arg Gln Glu Met Gly Gly Asn Ile Thr Arg Val Glu Ser Glu Asn Lys	
1425 1430 1435 1440	
gta gta att ttg gac tct ttc gag ccg ctc caa gcg gag gag gat gag	6169
Val Val Ile Leu Asp Ser Phe Glu Pro Leu Gln Ala Glu Glu Asp Glu	
1445 1450 1455	
agg gaa gta tcc gtt ccg gcg gag atc ctg cgg agg tcc agg aaa ttc	6217
Arg Glu Val Ser Val Pro Ala Glu Ile Leu Arg Arg Ser Arg Lys Phe	
1460 1465 1470	
cct cga gcg atg ccc ata tgg gca cgc ccg gat tac aac cct cca ctg	6265
Pro Arg Ala Met Pro Ile Trp Ala Arg Pro Asp Tyr Asn Pro Pro Leu	
1475 1480 1485	
tta gag tcc tgg aag gac ccg gac tac gtc cct cca gtg gta cac ggg	6313
Leu Glu Ser Trp Lys Asp Pro Asp Tyr Val Pro Pro Val Val His Gly	
1490 1495 1500	
tgt cca ttg ccg cct gcc aag gcc cct ccg ata cca cct cca cgg agg	6361
Cys Pro Leu Pro Pro Ala Lys Ala Pro Pro Ile Pro Pro Pro Arg Arg	
1505 1510 1515 1520	
aag agg acg gtt gtc ctg tca gaa tct acc gtg tct tct gcc ttg gcg	6409
Lys Arg Thr Val Val Leu Ser Glu Ser Thr Val Ser Ser Ala Leu Ala	
1525 1530 1535	
gag ctc gcc aca aag acc ttc ggc agc tcc gaa tcg tcg gcc gtc gac	6457
Glu Leu Ala Thr Lys Thr Phe Gly Ser Ser Glu Ser Ser Ala Val Asp	
1540 1545 1550	
agc ggc acg gca acg gcc tct cct gac cag ccc tcc gac gac ggc gac	6505
Ser Gly Thr Ala Thr Ala Ser Pro Asp Gln Pro Ser Asp Asp Gly Asp	
1555 1560 1565	
gcg gga tcc gac gtt gag tcg tac tcc tcc atg ccc ccc ctt gag ggg	6553
Ala Gly Ser Asp Val Glu Ser Tyr Ser Ser Met Pro Pro Leu Glu Gly	
1570 1575 1580	
gag ccg ggg gat ccc gat ctc agc gac ggg tct tgg tct acc gta agc	6601
Glu Pro Gly Asp Pro Asp Leu Ser Asp Gly Ser Trp Ser Thr Val Ser	
1585 1590 1595 1600	
gag gag gct agt gag gac gtc gtc tgc tgc tcg atg tcc tac aca tgg	6649
Glu Glu Ala Ser Glu Asp Val Val Cys Cys Ser Met Ser Tyr Thr Trp	
1605 1610 1615	
aca ggc gcc ctg atc acg cca tgc gct gcg gag gaa acc aag ctg ccc	6697
Thr Gly Ala Leu Ile Thr Pro Cys Ala Ala Glu Glu Thr Lys Leu Pro	
1620 1625 1630	
atc aat gca ctg agc aac tct ttg ctc cgt cac cac aac ttg gtc tat	6745
Ile Asn Ala Leu Ser Asn Ser Leu Leu Arg His His Asn Leu Val Tyr	
1635 1640 1645	
gct aca aca tct cgc agc gca agc ctg cgg cag aag aag gtc acc ttt	6793
Ala Thr Thr Ser Arg Ser Ala Ser Leu Arg Gln Lys Lys Val Thr Phe	
1650 1655 1660	
gac aga ctg cag gtc ctg gac gac cac tac cgg gac gtg ctc aag gag	6841
Asp Arg Leu Gln Val Leu Asp Asp His Tyr Arg Asp Val Leu Lys Glu	
1665 1670 1675 1680	

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atg aag gcg aag gcg tcc aca gtt aag gct aaa ctt cta tcc gtg gag Met Lys Ala Lys Ala Ser Thr Val Lys Ala Lys Leu Leu Ser Val Glu 1685 1690 1695	6889
gaa gcc tgt aag ctg acg ccc cca cat tcg gcc aga tct aaa ttt ggc Glu Ala Cys Lys Leu Thr Pro Pro His Ser Ala Arg Ser Lys Phe Gly 1700 1705 1710	6937
tat ggg gca aag gac gtc cg ^g aac cta tcc agc aag gcc gtt aac cac Tyr Gly Ala Lys Asp Val Arg Asn Leu Ser Ser Lys Ala Val Asn His 1715 1720 1725	6985
atc cgc tcc gtg tgg aag gac ttg ctg gaa gac act gag aca cca att Ile Arg Ser Val Trp Lys Asp Leu Leu Glu Asp Thr Glu Thr Pro Ile 1730 1735 1740	7033
gac acc acc atc atg gca aaa aat gag gtt ttc tgc gtc caa cca gag Asp Thr Thr Ile Met Ala Lys Asn Glu Val Phe Cys Val Gln Pro Glu 1745 1750 1755 1760	7081
aag ggg ggc cgc aag cca gct cgc ctt atc gta ttc cca gat ttg ggg Lys Gly Arg Lys Pro Ala Arg Leu Ile Val Phe Pro Asp Leu Gly 1765 1770 1775	7129
gtt cgt gtg tgc gag aaa atg gcc ctt tac gat gtg gtc tcc acc ctc Val Arg Val Cys Glu Lys Met Ala Leu Tyr Asp Val Val Ser Thr Leu 1780 1785 1790	7177
cct cag gcc gtg atg ggc tct tca tac gga ttc caa tac tct cct gga Pro Gln Ala Val Met Gly Ser Ser Tyr Gly Phe Gln Tyr Ser Pro Gly 1795 1800 1805	7225
cag cgg gtc gag ttc ctg gtg aat gcc tgg aaa gcg aag aaa tgc cct Gln Arg Val Glu Phe Leu Val Asn Ala Trp Lys Ala Lys Lys Cys Pro 1810 1815 1820	7273
atg ggc ttc gca tat gac acc cgc tgt ttt gac tca acg gtc act gag Met Gly Phe Ala Tyr Asp Thr Arg Cys Phe Asp Ser Thr Val Thr Glu 1825 1830 1835 1840	7321
aat gac atc cgt gtt gag gag tca atc tac caa tgt tgt gac ttg gcc Asn Asp Ile Arg Val Glu Glu Ser Ile Tyr Gln Cys Cys Asp Leu Ala 1845 1850 1855	7369
ccc gaa gcc aga cag gcc ata agg tcg ctc aca gag cgg ctt tac atc Pro Glu Ala Arg Gln Ala Ile Arg Ser Leu Thr Glu Arg Leu Tyr Ile 1860 1865 1870	7417
ggg ggc ccc ctg act aat tct aaa ggg cag aac tgc ggc tat cgc cgg Gly Gly Pro Leu Thr Asn Ser Lys Gly Gln Asn Cys Gly Tyr Arg Arg 1875 1880 1885	7465
tgc cgc gcg agc ggt gta ctg acg acc agc tgc ggt aat acc ctc aca Cys Arg Ala Ser Gly Val Leu Thr Thr Ser Cys Gly Asn Thr Leu Thr 1890 1895 1900	7513
tgt tac ttg aag gcc gct gcg gcc tgt cga gct gcg aag ctc cag gac Cys Tyr Leu Lys Ala Ala Ala Cys Arg Ala Ala Lys Leu Gln Asp 1905 1910 1915 1920	7561
tgc acg atg ctc gta tgc gga gac gac ctt gtc gtt atc tgt gaa agc Cys Thr Met Leu Val Cys Gly Asp Asp Leu Val Val Ile Cys Glu Ser 1925 1930 1935	7609
gcg ggg acc caa gag gac gag gcg agc cta cgg gcc ttc acg gag gct Ala Gly Thr Gln Glu Asp Glu Ala Ser Leu Arg Ala Phe Thr Glu Ala 1940 1945 1950	7657

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atg act aga tac tct gcc ccc cct ggg gac ccg ccc aaa cca gaa tac Met Thr Arg Tyr Ser Ala Pro Pro Gly Asp Pro Pro Lys Pro Glu Tyr 1955 1960 1965	7705
gac ttg gag ttg ata aca tca tgc tcc tcc aat gtg tca gtc gcg cac Asp Leu Glu Leu Ile Thr Ser Cys Ser Ser Asn Val Ser Val Ala His 1970 1975 1980	7753
gat gca tct ggc aaa agg gtg tac tat ctc acc cgt gac ccc acc acc Asp Ala Ser Gly Lys Arg Val Tyr Tyr Leu Thr Arg Asp Pro Thr Thr 1985 1990 1995 2000	7801
ccc ctt gcg cggt gct ggc tgg gag aca gct aga cac act cca gtc aat Pro Leu Ala Arg Ala Ala Trp Glu Thr Ala Arg His Thr Pro Val Asn 2005 2010 2015	7849
tcc tgg cta ggc aac atc atc atg tat gcg ccc acc ttg tgg gca agg Ser Trp Leu Gly Asn Ile Ile Met Tyr Ala Pro Thr Leu Trp Ala Arg 2020 2025 2030	7897
atg atc ctg atg act cat ttc ttc tcc atc ctt cta gct cag gaa caa Met Ile Leu Met Thr His Phe Phe Ser Ile Leu Leu Ala Gln Glu Gln 2035 2040 2045	7945
ctt gaa aaa gcc cta gat tgt cag atc tac ggg gcc tgt tac tcc att Leu Glu Lys Ala Leu Asp Cys Gln Ile Tyr Gly Ala Cys Tyr Ser Ile 2050 2055 2060	7993
gag cca ctt gac cta cct cag atc att caa cga ctc cac ggc ctt agc Glu Pro Leu Asp Leu Pro Gln Ile Ile Gln Arg Leu His Gly Leu Ser 2065 2070 2075 2080	8041
gca ttt tca ctc cat agt tac tct cca ggt gag atc aat agg gtg gct Ala Phe Ser Leu His Ser Tyr Ser Pro Gly Glu Ile Asn Arg Val Ala 2085 2090 2095	8089
tca tgc ctc agg aaa ctt ggg gta ccg ccc ttg cga gtc tgg aga cat Ser Cys Leu Arg Lys Leu Gly Val Pro Pro Leu Arg Val Trp Arg His 2100 2105 2110	8137
cggt gcc aga agt gtc cgc gct agg cta ctg tcc cag ggg ggg agg gct Arg Ala Arg Ser Val Arg Ala Arg Leu Leu Ser Gln Gly Gly Arg Ala 2115 2120 2125	8185
gcc act tgt ggc aag tac ctc ttc aac tgg gca gta agg acc aag ctc Ala Thr Cys Gly Lys Tyr Leu Phe Asn Trp Ala Val Arg Thr Lys Leu 2130 2135 2140	8233
aaa ctc act cca atc ccg gct gcg tcc cag ttg gat tta tcc agc tgg Lys Leu Thr Pro Ile Pro Ala Ala Ser Gln Leu Asp Leu Ser Ser Trp 2145 2150 2155 2160	8281
ttc gtt gct ggt tac agc ggg gga gac ata tat cac agc ctg tct cgt Phe Val Ala Gly Tyr Ser Gly Gly Asp Ile Tyr His Ser Leu Ser Arg 2165 2170 2175	8329
gcc cga ccc cgc tgg ttc atg tgg tgc cta ctc cta ctt tct gta ggg Ala Arg Pro Arg Trp Phe Met Trp Cys Leu Leu Leu Ser Val Gly 2180 2185 2190	8377
gta ggc atc tat cta ctc ccc aac cga tga acggggagct aaacactcca Val Gly Ile Tyr Leu Leu Pro Asn Arg * 2195 2200	8427
ggccaatagg ccatcctgtt ttttccctt ttttttttc tttttttttt tttttttttt 8487 ttttttttt ttttctccctt tttttttccctt ctttttttcc ttttcttcc tttgggtggct 8547 ccatcttagc cctagtcacg gctagctgtg aaaggtccgt gagccgcttg actgcagaga 8607 gtgctgatac tggcctctct gcagatcaag t 8638	

}

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<210> 26
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<212> RNA
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<400> 26
gccagcc

7

<210> 27
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<212> RNA
<213> HCV

<400> 27
gccagc

6

<210> 28
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14

<210> 29
<211> 6
<212> DNA
<213> E.coli

<400> 29
gaattc

6